ELECTRICAL WEST

Part 1

April 1950
50 Cents

Manufacturers' Directory Issue

SPOKESMAN FOR THE MOST HIGHLY ELECTRIFIED REGION OF THE U. S.

Getting back to the business of selling, *real* sell[illegible] is the backbone of the Edison Company's business development pro[illegible] for 1950. It's a program strengthened with new ideas, additio[illegible]ersonnel and increased sales promotion activities.

All of us in this business must get together now and fight harder for our share of the income dollar, and Edison Company plans include additional selling aids for appliance dealers and suppliers of electric equipment to farms, businesses and industry. We will reach new customers and encourage old ones to enjoy the many benefits which expanded use of our service can bring.

Electric appliance dealers in Edison territory have received copies of our program for "Going Through 1950 Under Full Sale!" and of course we'll also continue the advertising formula which has worked so well through the years: "Edison tells them, and the dealer sells them!"

Edison SOUTHERN CALIFORNIA EDISON COMPANY

Now-
Get load ratio control
—still save with
RM* Transformers

Automatic load-ratio-control equipment, for changing taps under load, is now optional on General Electric three-phase oil-immersed RM-listed Power Transformers:

20% range—10% plus to 10% minus
32 5/8-per-cent steps
Available in 1391 different ratings—
All kva's from 750 to 10,000, three-phase
All EEI-NEMA preferred voltage ratings between:
6900 and 67,000 high-voltage
2400 and 14,400 low-voltage

***RM means "Repetitive Manufacture"—a type designation covering G-E power transformers with standardized construction up to 10,000 kva and 69 kv. This effective standardization—sensibly flexible with optional features—spells lower costs for you. RM prices are eight per cent lower. RM shipments with load-ratio-control average 15 weeks.**

For information on RM transformers with load-ratio-control feature, ask your nearest G-E Apparatus Sales Office. *Apparatus Dept., General Electric Company, Schenectady 5, N. Y.*

GENERAL ELECTRIC

With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.

APRIL
1950

SPOKESMAN FOR MOST HIGHLY ELECTRIFIED REGION OF THE U. S.
The all-industry magazine of progress, established 1887, and incorporating the "Electrical Journal," "Journal of Electricity, Power and Gas" and "Journal of Electricity." Contents copyright. Sixty-second year of publication

ELECTRICAL WEST

James H. McGraw (1860-1948), Founder
Curtis W. McGraw, Chairman of the Board — George C. Tenney, President and Editor
W. A. Cyr, Associate Editor — Walter C. Heston, Engineering Editor
Peggy Boyer, Assistant Editor — R. A. Belzarl, Publishing Counselor
John W. Otterson, Manager — John Coats, Typography

Next Month

Do people really know what socialism is? To make the public conscious of what socialism is and how it affects their daily lives, the Washington Water Power Co. has instituted a series of cartoon contests. Results will be shown in the leading article for May.

Features in the engineering section will be a timely article on traffic interference problems in connection with utility construction. The author tells how the city of Los Angeles is handling the problem to ward off restrictive legislation. A regular May feature is the annual federal report of snow surveys in the West. These indicate how much water will be available for irrigation and power for the season. Another article will tell how a power company obtains bonus runoff for its hydro plants by cloud seeding.

Can wiring be simplified? An architect says it must be—an engineer says it can be. Read this thought provoking article. It deals with one of the industry's serious problems — complexity of present wiring methods. Another article will describe the electrical distribution system and lighting in the new Carnation world headquarters building in Los Angeles. Both lighting and power are distributed at 480 volts.

Data sheets, news letters and the regular features will round out an information packed issue.

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Cover Photo: Mr. and Mrs. Bob Halvorson, La Jolla dealers, are being coached by Al Jewell of Graybar, San Diego, while they set up a window display for Electrical Housewares Week, April 14-22.

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Cleveland (15) ..... Frank J. Seiler, 1510 Hanna Bldg.
Los Angeles (14) ..... W. D. Lanier, 621 S. Hope St., MI. 3691
New York (18) ..... John P. Eichorn, 330 W. 42nd St.
San Francisco (4) ..... Tom Carmody, 68 Post St., DO. 2-4600

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NO. 4

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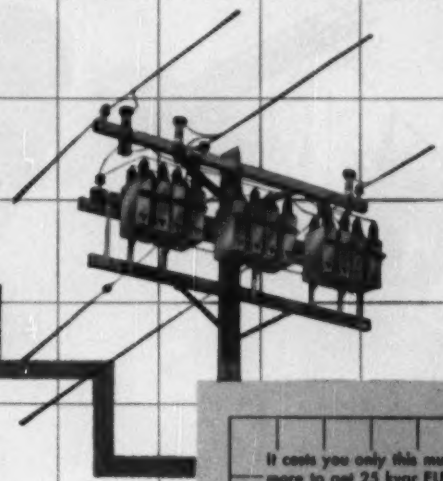
DOWN GOES THE COST PER KVAR WITH

ELEMEX capacitors in stainless steel tanks



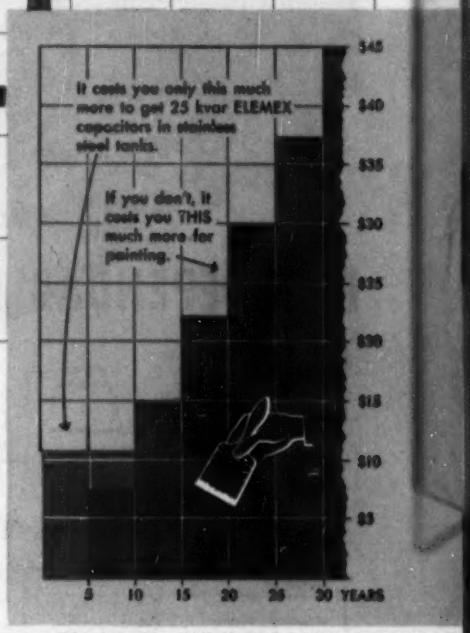


Chart shows the additional cost for painting capacitors, based on utility company averages of $7.50 per job, every five years. (15 kvars cost only $6.75 more than mild steel. The first paint job more than pays the difference.) Costs and periods vary with local conditions and practices—but on the average, you'll be ahead of the game on the second paint job! Because of the long life of ELEMEX capacitors, you'll make plenty of savings! (Utility cost estimates are based on the fact that it's almost impossible to paint a capacitor on the pole, and units are usually taken down and into the shop while a freshly painted bank is installed.)

7620

Want to save some real money? You can, by installing good capacitors to improve power factor and lower line losses. For even greater savings choose ELEMEX capacitors, whose stainless steel tanks never need painting!

When you eliminate painting, you soon pay for the slightly higher first cost of ELEMEX capacitors. Then you begin to pile up worthwhile savings—a real aid in combatting constantly rising maintenance costs.

ELEMEX capacitors offer many other advantages: conservative design with low unit stress for long life; individual evacuation, capillary impregnation, and constant testing in production; "Hydis" surface treatment for high heat dissipation; Paragroove connectors to simplify installation; L-M "Lifetime" solder-sealed bushings.

Throw away your paint brush! Get ELEMEX long-life capacitors in stainless steel tanks. Get the whole story; ask the L-M Field Engineer for Bulletin PC1 or write Line Material, Capacitor Division, Milwaukee 1, Wisconsin (A McGraw Electric Company division).

LM

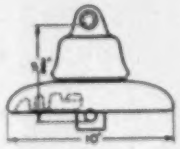
LINE MATERIAL . . . Capacitors

Complete Coordinated Equipment for Distribution Today

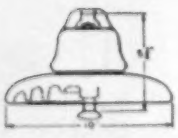
ANOTHER VICTOR INSULATOR THAT SAVES AS IT SERVES
Left: Installing Victor suspension insulators on a power line in the Southwest

Install Victor Suspension Insulators

FOR DEPENDABLE ON-THE-JOB PERFORMANCE



No. 800
Clevis type



No. 900
Ball and socket type

VICTOR No.		800 and 900
60 cycle dry flashover	KV	80
60 cycle wet flashover	KV	50
Pos. impulse flashover	KV	125
Neg. impulse flashover	KV	130
Dry arcing distance	In.	7¾
Leakage distance	In.	11½
Impact rating	In. Lbs.	55
M and E strength	Lbs.	15000

CONTINUOUS, trouble-free insulator service *counts* when it comes to *lower* maintenance and replacement costs on transmission lines. That's why more and more successful power companies are *specifying* Victor suspension insulators.

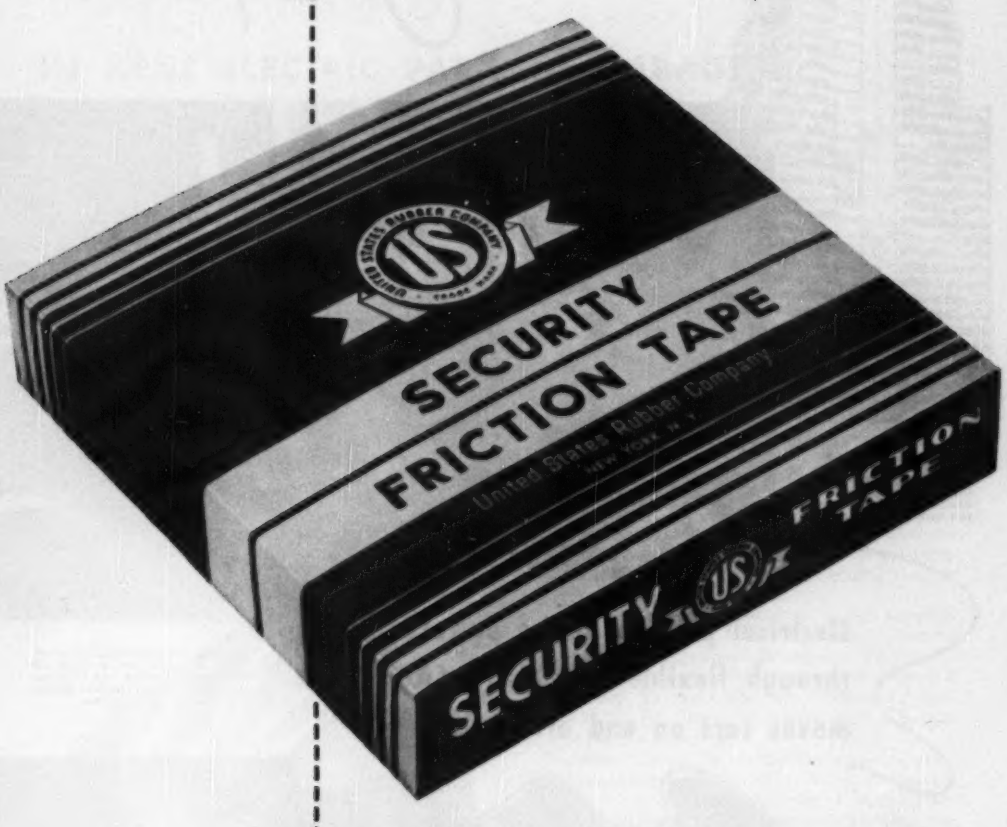
Even under the most severe service conditions, you can rely on Victor's rugged suspension insulators for years of uninterrupted transmission. *Each* one is rigidly inspected and tested at *every* point of manufacture, and must *easily* meet *all* NEMA standards. For you this means dependable performance *on the job!*

Get All the Facts!

REPRESENTATIVES IN THE FOLLOWING WESTERN CITIES:

Los Angeles, Cal.
San Francisco, Cal.
Portland, Ore.
Seattle, Wash.
Spokane, Wash.
Boise, Idaho
Salt Lake City, Utah
Denver, Colo.
Phoenix, Ariz.

NEVER LETS YOU DOWN!



"SECURITY"—THE FRICTION TAPE MADE BY

● For electrical and general purpose jobs, Security Tape will never let you down. Its adhesive compound is not just sticky, but strong and rubbery. To handle tougher jobs, the fabric is unusually high in tensile strength. Security has no pinholes to cause leaks. Straight-tearing, non-ravelling.

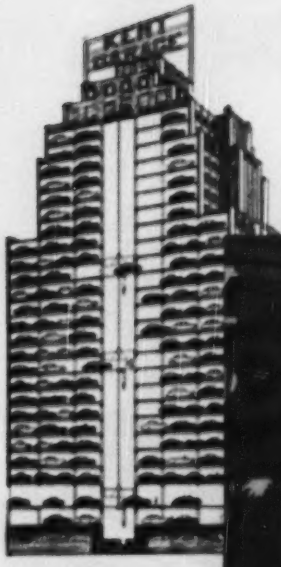
ASK YOUR WHOLESALER FOR SECURITY

U.S. RUBBER
SERVING THROUGH SCIENCE

UNITED STATES RUBBER COMPANY

MECHANICAL GOODS DIVISION • ROCKEFELLER CENTER, NEW YORK 20, N. Y.

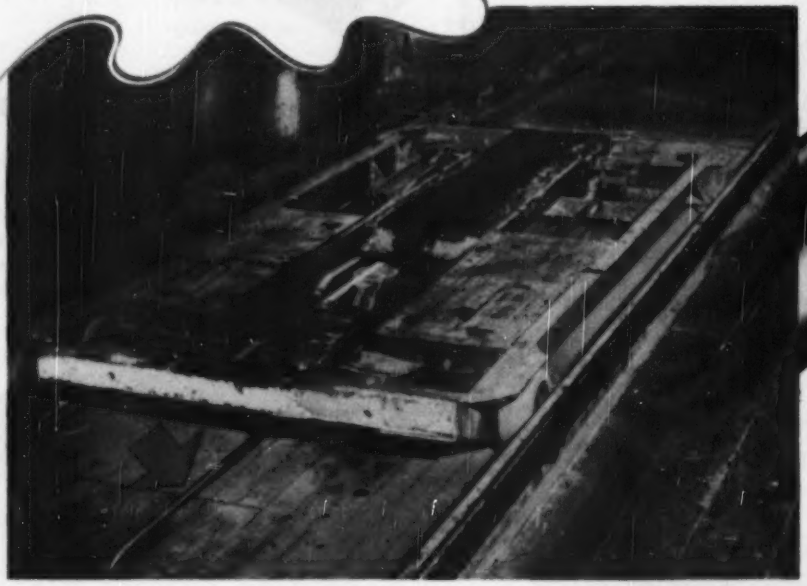
Cars parked...



Cars are parked twenty-three high in this electric parking garage—and they are never touched by human hands until the owner gets back in.

Electrical parking device powered through flexible AMERCLAD CABLE moves cars on and off elevators.

Electric parker installed in elevator rolls out under car, contacts the differential housing and pulls car back into elevator. Operator handles all controls from elevator.



Note the rubber-covered flexible Amerclad Cable that powers the three parker motors. This cable gets constant flexing over the pulley, must stand abrasion and oil droppings.

untouched by human hands

IN KENT ELECTRIC PARKING GARAGES

• At last you can have your car parked in a big city and get it back quickly without dents in the fenders.

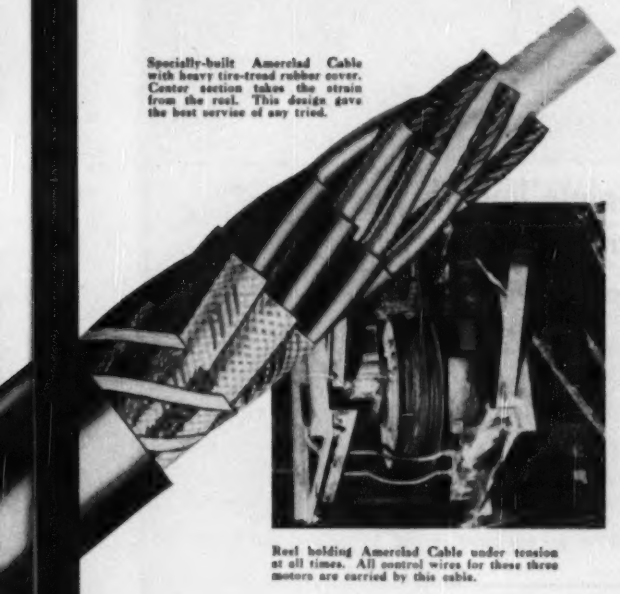
The man who did something about the big city parking situation was Mr. Milton A. Kent from the small town of Kenosha, Wisconsin. He designed an electric parking garage based on the idea that the garage must be near the motorists' destination, quick and safe in handling cars, reasonable in price, and of good architectural design. Four of these garages are already operating in Chicago, Cincinnati and New York.

How they work

The heart of the idea is an electric parking machine used in combination with a high-speed automatic landing elevator. The motorist drives up in front of the elevator door, leaves his car in neutral with the brake off. The elevator operator sends the electric parker out under the automobile, raises a platform which bears against the car's differential and rolls the car onto the elevator without lifting it. The process is reversed in parking the car. At no time is the car driven by the attendant.

U·S·S Amerclad Electric Cable

SUPPLIES POWER TO ELECTRIC PARKER



Specially-built Amerclad Cable with heavy tire-tread rubber cover. Center section takes the strain from the reel. This design gave the best service of any tried.

Reel holding Amerclad Cable under tension at all times. All control wires for these three motors are carried by this cable.

THE electric parker is a low four-wheel machine driven by electric motors. It scoots out from the elevator like a spider, grabs a car and hauls it back in.

A flexible Amerclad Cable on a reel supplies power to the parker. This cable takes a terrific beating. It is dragged over the concrete floor, picks up oil and is constantly reeled and unreeled over a small pulley. Various cables were tried and Amerclad was finally chosen because it gave the best service for the least cost.

Amerclad Cables for extremely severe service like this are especially designed. They are heavier than usual and have a thick cover of tough oil-resisting Amerprene rubber which wears like tire treads.

This is an unusual and limited application but it illustrates how our engineers can help you solve difficult cable problems. They have developed cables with many different rubber formulations—including conducting rubber for shielding and rubber for underground cables such as are now approved for airport use without conduits.

Write for our new 64-page book on U·S·S Amerclad which describes all types of rubber-covered cables and shows where each type should be used.

AMERICAN STEEL & WIRE COMPANY, GENERAL OFFICES: CLEVELAND, OHIO
COLUMBIA STEEL COMPANY, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS
TENNESSEE COAL, IRON & RAILROAD COMPANY, BIRMINGHAM, SOUTHERN DISTRIBUTORS
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USS AMERCLAD CABLES
UNITED STATES STEEL

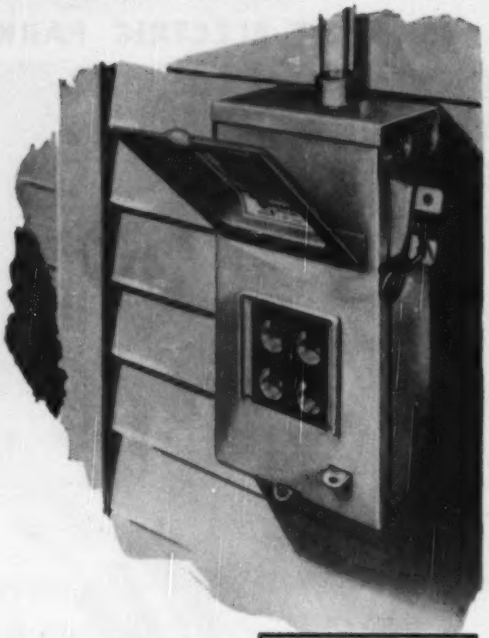
The Switch is to General *for Outdoor Service*

Single and Double Pullout Combinations

Front Operated Toggle Combinations

100 Amp Fusible Main Service Equipment

30 to 1200 Amp, HP rated Safety Switches



R33NP4 Side Operated Plug Fused Service Equipment

General makes a complete line of Weatherproof and Raintight Service Equipment and Safety Switches

THE next time take a good look at General's outdoor equipment—recognized as one of the most complete lines of service entrance equipment and safety switches.

Enclosures made of *Zincgrip* steel are finished with a machine gray baked enamel for thorough protection against weathering—Dependable hinge design safeguards interiors from rain, sleet or snow—Ample knuckle room and abundant knockouts are provided for convenient wiring.

These and many more distinctive features will be apparent to you immediately upon examination—sold everywhere exclusively through wholesalers.

Write for our latest catalog 4809—and supplement 4911

General Switch Corp.

49 Roebling Street Brooklyn 11, N. Y.

One of the largest Manufacturers of:

SERVICE ENTRANCE EQUIPMENT . . .
Pullout, Front Operated Toggle and Side Operated types. Indoor—surface or flush, and Outdoor.

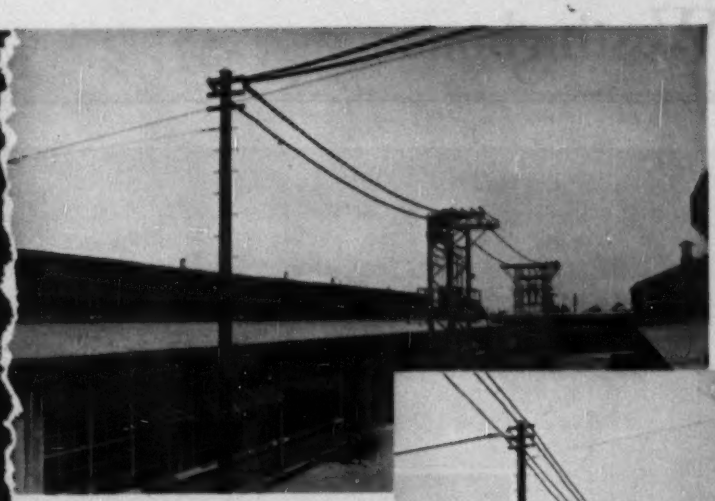
ENCLOSED SAFETY SWITCHES . . .
30 through 1200 Amp., 250 V and 600 V Type A, C and D. Indoor and outdoor. HP rated.

BRANCH—CIRCUIT PANELS

SALES OFFICES IN EVERY MAJOR CITY

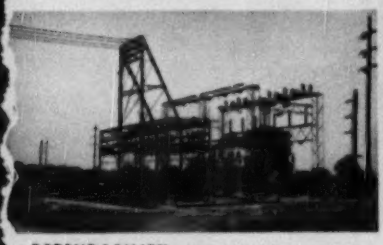
OKOLITE-OKOPRENE

SELF-SUPPORTING AERIAL CABLE



COMPACTNESS—self-evident space economy eliminates congestion, reduces clearance problems, gives a neater, more streamlined appearance in keeping with modern efficiency. Simple line tap, permitted with Okonite's Duolay* construction, serves the 2300/440 volt steel platform substation.

DURABILITY—no ring-cutting; permanently weatherproof, non-conducting Okoprene sheath; high-voltage, heat and moisture resisting Okolite insulation. These Okonite values mean long-lived, trouble-free circuits. Four circuits above are carried from station (background) on pedestal-mounted tubular steel poles with steel cross arms welded in place.



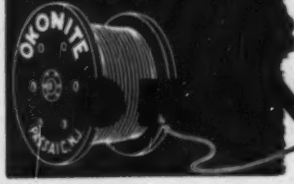
DEPENDABILITY—"storm-safe;" fewer service interruptions or outages; improved circuit regulation because of lower reactance; freedom from lead sheath troubles. 44kv/2.3kv jointly operated transformer and switching substation containing the Alabama Power Co. step-down transformer and the Hazel-Atlas Glass Co. outdoor oil circuit-breakers shown above.

ECONOMY—save on installation as well as maintenance costs with Okonite S/S cable. Reasonable first cost; simple, quick installation. Long spans require fewer poles; fewer items to be purchased and stocked. Exclusive Duolay assembly permits ample separation of conductors without cutting copper conductors or performing any operation on messenger. Practically no maintenance is required.

*U. S. Pat. 2430878

Four thousand feet of Okolite-Okoprene "Line-Tap" Self-Supporting Aerial Cable serve the new plant of the Hazel-Atlas Glass Company at Montgomery, Alabama. According to company officials, this installation provides a compact, durable and dependable arrangement, in keeping with the modern efficiency of the plant. It represents another proof of the advantages of Okonite Self-Supporting Cable for industrial applications.

Outdoors, on poles or on brackets attached to buildings—or indoors, where circuits can be carried overhead supported by beams or trusses—Okolite-Okoprene Self-Supporting Aerial Cables provide a modern, dependable and economical method of industrial power transmission. They are described in a 52-page manual available to electrical engineers and company executives. For your copy, send a request on your letterhead to The Okonite Company, Passaic, N. J.



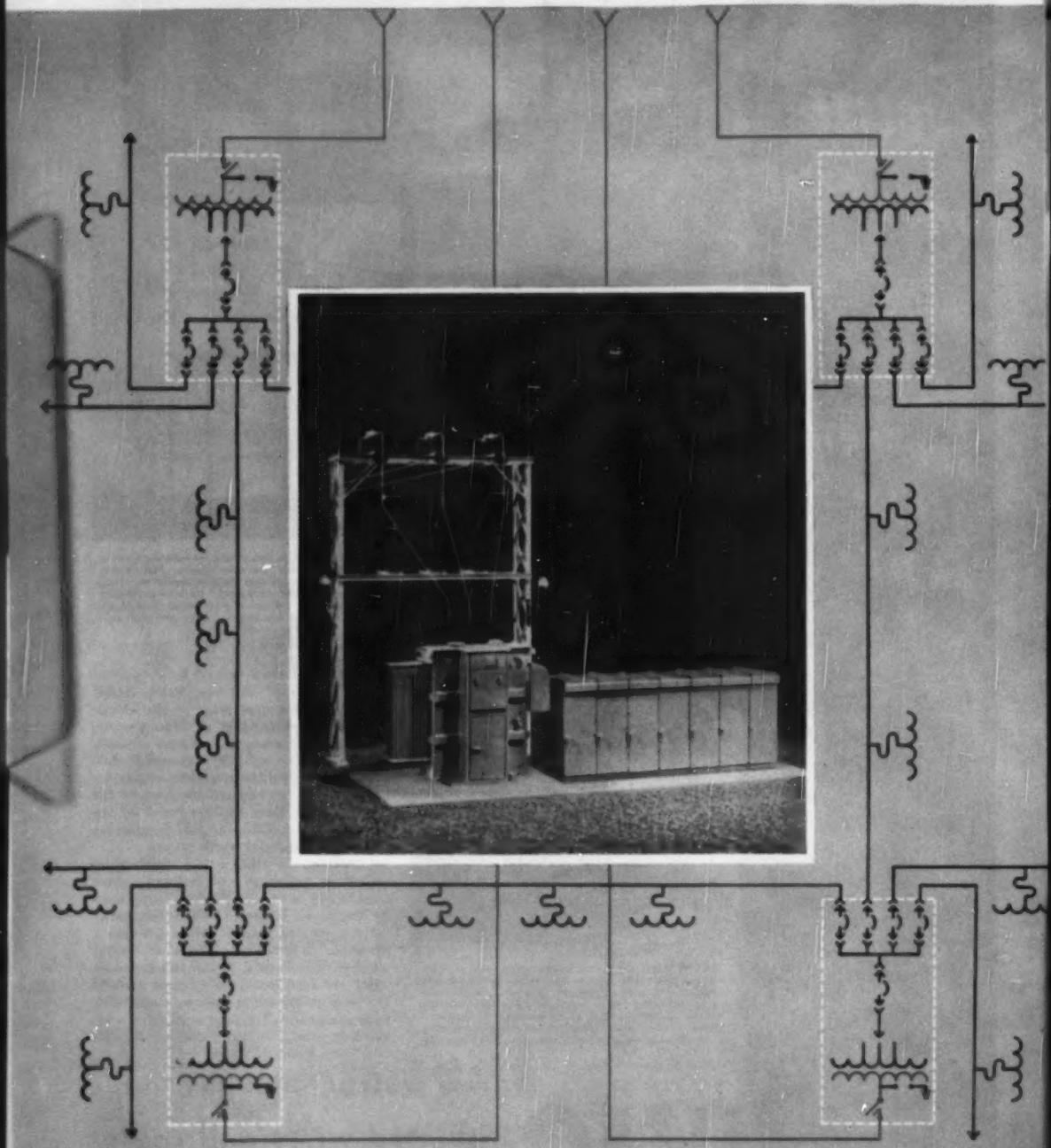
THE BEST CABLE IS YOUR BEST POLICY

NITE SINCE 1878 *insulated wires and cables*

7089

YOU CAN BE **SURE**.. IF IT'S

Westinghouse



Co-ordinated Substation of the Primary Network type energized from a single subtransmission circuit.

CO-ORDINATED SUBSTATIONS

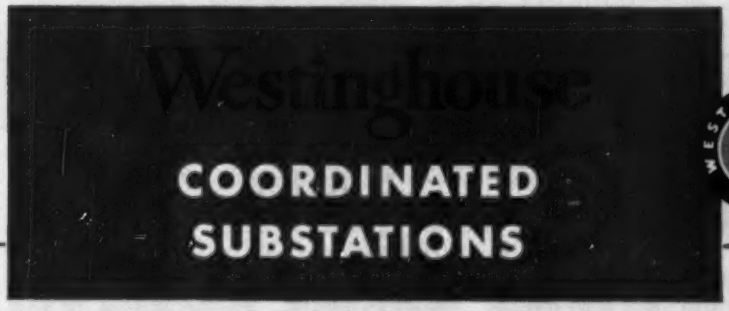
Help Simplify Systems *and* Lower Power Distribution Costs

The substations you choose *now* will become vital tools in building simplified systems . . . *and* lowering power distribution costs; therefore, *their inherent design must provide for these factors.*

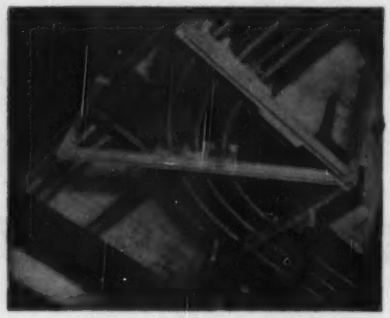
The Westinghouse Co-ordinated Substation, shown here, is one example. It is a compact standardized unit designed to economically answer Primary Network requirements. It is completely co-ordinated from incoming line facilities to outgoing feeders.

This relatively small, bus-regulated substation, and its associated system, economically simplify many distribution problems. Individual feeder regulation is eliminated. Fewer high-voltage breakers are required. The cost of switching on the subtransmission side of the station is reduced. Unitized construction provides flexibility for meeting future load requirements. Transformers and breakers can be quickly de-energized for maintenance . . . without service interruption.

As you plan for the future and gradually simplify your system, be sure you have considered the benefits of Westinghouse Co-ordinated Substations. Their part in long-range power distribution economies has been carefully considered in every phase of their design and construction. More information is given in Booklet B-4061. Ask your Westinghouse representative or write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-40729



Give installation problems...



How one manufacturer solved a difficult installation problem through the use of flexible interlocked-armor cable.

THE RUN-AROUND

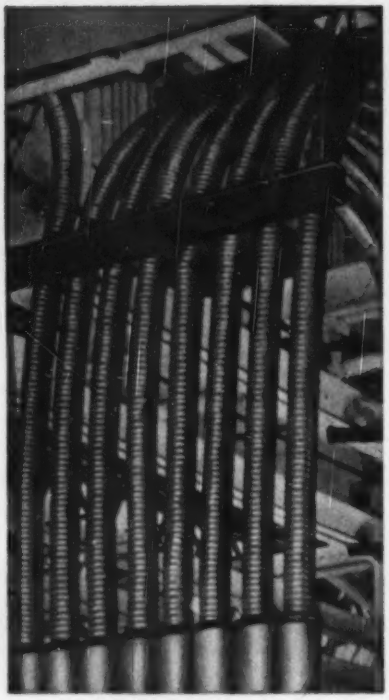
with INTERLOCKED-ARMOR CABLE

Pillars, I-beams, piers, partitions, and other obstacles often interfere with the installation of new plant power circuits. Result? Expensive drilling, channeling and tricky layouts... extra plant downtime . . . increased over-all installation costs.

However, there *is* a simple low-cost solution—time-saving General Electric *interlocked-armor cable with the famous No. 1799 varnished-cambric insulation.* This self-protecting cable was specifically designed to facilitate installation of plant power circuits in difficult locations. A ready-to-install cable assembly, G-E interlocked-armor cable may be readily bent around obstructions. It can be strung over long runs without pull boxes. It need merely be laid up on existing beams or hung with wire brackets.

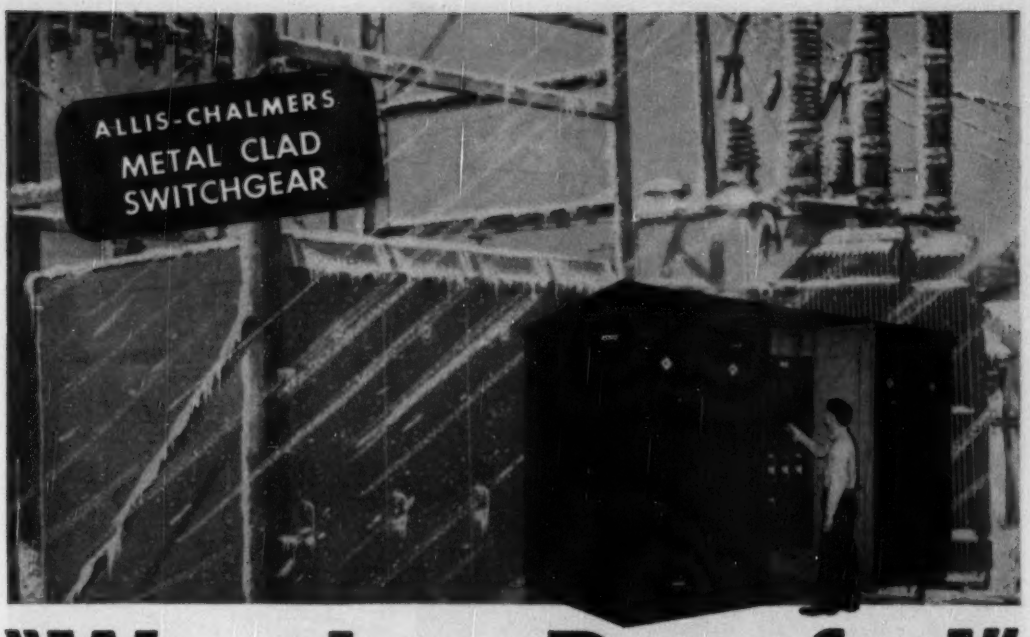
There's no further protection to fuss with. No complicated layouts to plan. No wire pulling. In some cases, you can actually save up to 50% on time, 70% on weight, and—at the same time—get improved circuit voltage regulation, through closer spacing of conductors. Investigate G-E interlocked-armor cable on your next power installation—it may pay you big dividends.

For complete data on General Electric interlocked-armor cable, write to Section W3-425, Construction Materials Department, General Electric Company, Bridgeport 2, Connecticut.



General Electric interlocked-armor cable runs around obstacles — needs no special installation techniques!

GENERAL ELECTRIC



"Weather-Proofed"

AGAINST RAIN, SLEET, SUB-ZERO TEMPERATURES AND HIGH WINDS!

WEATHER-PROOFED Allis-Chalmers switchgear performs dependably in rain, sleet, sub-zero temperatures and high winds. Weather-proof construction provides protection in any weather... any atmosphere.

Here's why: (1) welded-in floor plates form tight bottom seal; (2) overhanging eaves keep out driving rain and sleet and protect vital switching equipment; (3) front and rear weather-proof door are held closed at three points; (4) rust resistant phosphate treated steel panels, multi-coated with weather tested paint, complete the top-to-bottom weather barrier; (5) ice and sleet shields protect locks.

Contact your local A-C sales representative for further information or write direct.

ALLIS-CHALMERS, 939A SO. 70 ST. A 2916
MILWAUKEE, WIS.

. . . PLUS OTHER ADVANTAGES

Protected Ventilation

Copper mesh filters behind louvre openings bar the entry of dust, dirt, insects, etc. They allow air to circulate and cool the switchgear interior. Space heaters prohibit moisture condensation, a frequent cause of insulation failure.

Full Length Instrument Panel

Provides more space for meters, relays, instruments. Panel swings out so you can readily reach secondary wiring. Provides protection, too. This design is adaptable to a variety of circuit arrangements.

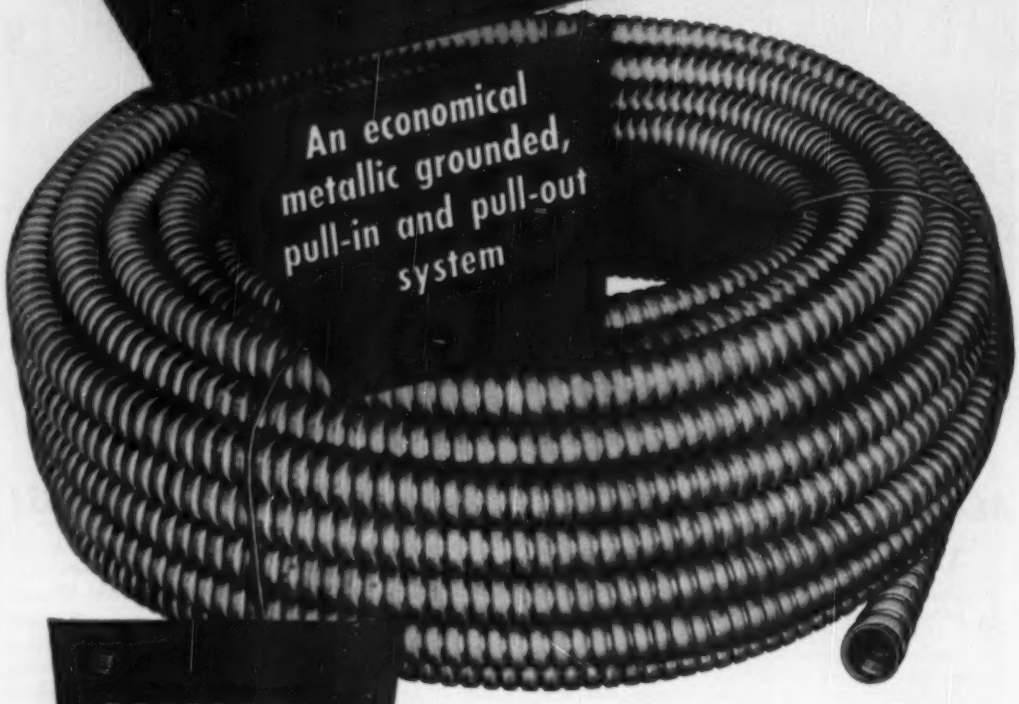
Safer Than Ever Before

Bolted-on steel barriers completely isolate circuit breaker, current transformer, disconnect switch, lightning arresters, drawout potential and control transformer, and other equipment compartments.

ALLIS-CHALMERS

FLEXSTEEL

Immediate shipment from electrical wholesalers' stocks



FLEXSTEEL cuts installation time *more than 50%* under rigid conduit . . . Reduces conduit footage . . . Virtually eliminates the waste in materials and labor.

- No bending tools needed
- No exacting measurements required
- No coupling or jointing
- No short pieces or waste
- Easy to carry and handle
- Easy to fit—outlet to outlet
- Easy to cut on the job
- Easy to fish

FOR WIRING HOUSING . . . FACTORY BUILDINGS . . . PRODUCTION LINES . . . COMMERCIAL BUILDINGS . . . ELECTRICAL MACHINERY

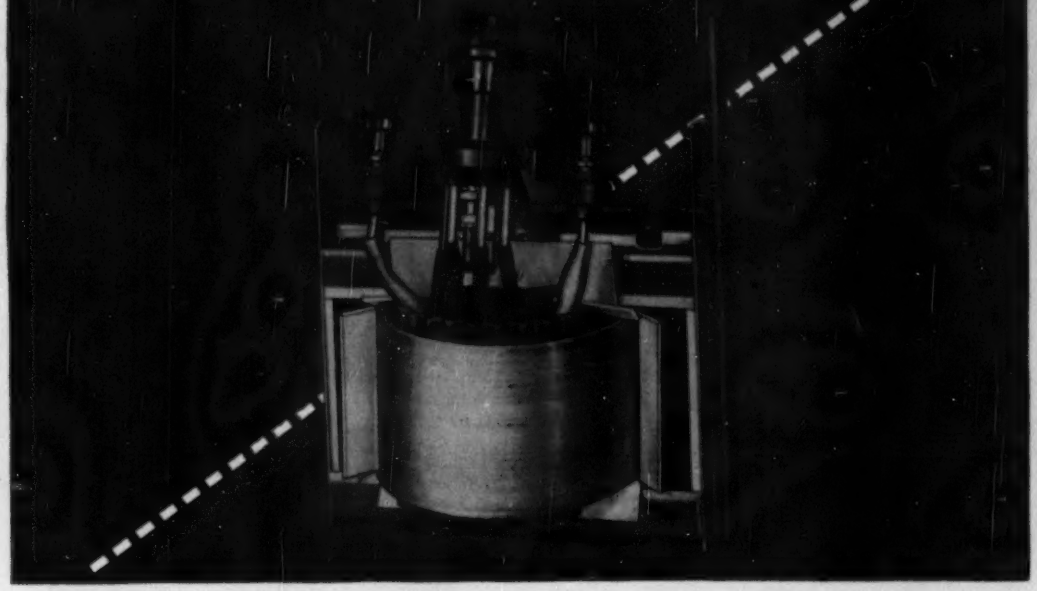
Available from stock *immediately!* Prompt shipment to wholesalers from our new Torrance, California, plant.

For Better Building Wire—Better Buy National Dilec Safecote

National Electric Products Corporation

1308 CHAMBER OF COMMERCE BLDG.
PITTSBURGH 19, PA.

Re-core with HiperCore



Modernize your burned-out or old transformers ...increase their Kva ratings

- **Save up to 30% of new transformer cost**
- **Increase 1½ Kva transformers to 3 or 5 Kva**
- **Get "new transformer" loss and other performance guarantees**

By a simple re-coring operation your burned-out or old transformers can be made into transformers that are new and up-to-date in design and performance. Many old transformers were contained in tanks larger than those required for HiperCore transformers, so it is possible to install HiperCore core-and-coil units of the next larger Kva rating in the old tanks. Frequently, 1½ Kva transformers may be changed to 5 Kva, and 3 Kva transformers may be changed to 7½ Kva. It is possible to save up to 30% of the cost of new transformers.

HiperCore core-and-coil units supplied for replacement purposes are the same as those used in new Moloney transformers and are not special "replacement" units having higher losses and poorer voltage regulation.

You can re-core these transformers yourself or have an authorized Moloney Repair Shop do the job for you. For further information write Moloney Electric Company, St. Louis 20, Missouri.

MEBO-5

3 Kva HiperCore core-and-coil unit (left) and 3 Kva unit typical of older designs (right). Smaller size of HiperCore unit, achieved by use of wound cores made of high permeability, oriented, silicon steel, permits use of larger Kva ratings in old tanks.

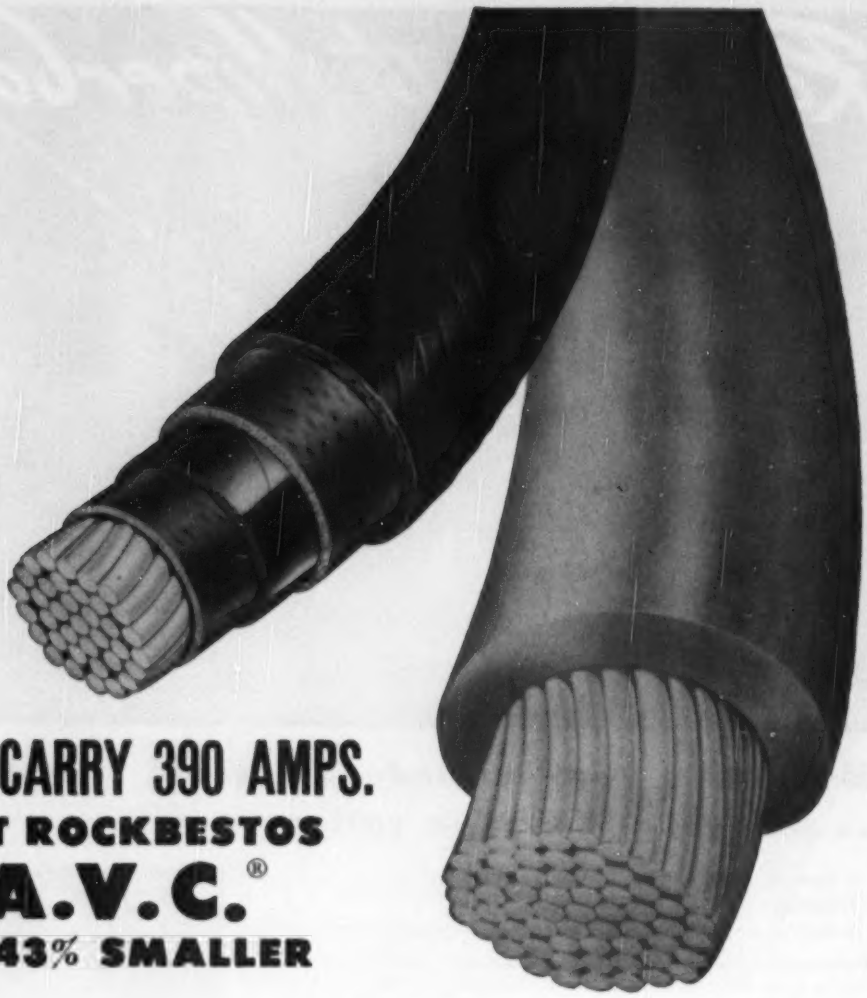
MOLONEY MANUFACTURES . . .

Step Voltage Regulators • Regulating Transformers • Load Ratio Control Transformers • Unit Substations • Load Center Transformers • Power Transformers • HiperCore Distribution Transformers (Conventional and CSP Types) • Askarel (Non-Inflammable Liquid) Cooled Transformers • Network Transformers • Air-Cooled (Class A and Class B Insulated) Transformers • Constant Current Street Lighting Transformers (Packaged Unit and Standard Types) Submersible Type Transformers • Capacitors

MOLONEY ELECTRIC COMPANY

Sales Offices in all Principal Cities

FACTORIES AT ST. LOUIS 20, MO. AND TORONTO, ONTARIO, CANADA



BOTH CARRY 390 AMPS.
BUT ROCKBESTOS
A.V.C.®
IS 43% SMALLER

With higher-rated A.V.C. and a 390 ampere load INSTALLED COSTS ARE LOWER*—

- **you use a 400 MCM cable *not* 700 MCM**
- **you use 3″ conduit *not* 3½″**
- **you use *smaller* fittings and lugs**
- **you have *lower labor costs* because smaller, lighter cable and conduit are quicker and easier to handle.**

Size for size A. V. C. has a HIGHER AMPERE RATING

Hi

. . . YOUR BEST BUY

Permanently-insulated Rockbestos A.V.C. can save you money. Write for the booklet "Cut Current Carrying Costs."

*Comparison with Type RH based on Chapter X—National Electrical Code, 60°C-104°F Ambient

ROCKBESTOS A.V.C.

ROCKBESTOS PRODUCTS CORPORATION
New Haven 4, Connecticut
OFFICE AND WAREHOUSE, OAKLAND MUNICIPAL AIRPORT, OAKLAND, CAL.
LOS ANGELES DISTRICT OFFICE, 6919 SAN FERNANDO RD., GLENDALE, CAL.

LOOK FOR G-E 2-WAY RADIO

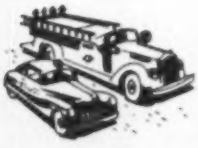
— in the Oil Fields
. . . with drillers, producers, pipeliners

— in Heavy Construction
. . . on dams, dredging jobs, highway construction

— in Logging
. . . for money-saving efficiency, close fire control

— in Taxi Fleets
. . . for faster service, more fares

— in Public Service Vehicles
. . . for powerline construction, emergency repairs



— in Police & Fire Departments
. . . for community safety

— and wherever instant communication is vital or delay expensive!

2-Way Radio

NOW

GET ALL 3 in the NEW G-E SINGLE-UNIT 10-watt mobile combination

SLASHES

★ Initial cost as much as 12%
★ Tube costs as much as 30%
★ Transmit battery drain up to 33%
★ Standby battery drain up to 30%

In lower first cost—lower maintenance cost—less space, this G-E *service-proved* mobile combination offers you more practical advantages than any other single unit on the market . . .

- **. . . BECAUSE it uses fewer tubes. You'll save as much as $11 per set in replacement costs alone . . .**
- **. . . BECAUSE standby battery drain is less than 9 amperes—transmit drain under 20 amperes . . .**
- **. . . BECAUSE it can be tuned in the field with standard tools and meter . . .**
- **. . . BECAUSE adjustable IF gain control compensates for aging of tubes and extends usable tube life . . .**

And that's not all! Only General Electric—no other manufacturer—now gives you these features: triple-tuned transformers for extra high selectivity, peak audio output of 2 watts, adjustable IF gain control, and built-in low pass harmonic filter that reduces interference to other services, including television.

Turn the page and study the comparison chart of G-E features against competition. Next time you sign a check for communication equipment, ask yourself this question: Am I getting the best 2-way radio—per dollar of investment—that is available to me?

You can put your confidence in . . .

GENERAL ELECTRIC

YOU BE THE JUDGE — HERE ARE THE FACTS

	GENERAL ELECTRIC 10 WATT UNIT	Manufacturer A	Manufacturer B	Manufacturer C
Permeability-Tuned Transformers (high selectivity with fewer tubes)	Yes	No	No	No
7 Watts Peak Audio Output	Yes	No	No	No
Full Range: 148-174 mc in one model	Yes	No	No	Yes
Instantaneous Modulation Limiting	Yes	Yes	No	No
All Tuned Circuits accessible from top of chassis	Yes	No	No	Yes
Adjacent Channel Selectivity	Yes	Yes	Yes	No
Synchronous Vibrator Power Supplies (no rectifier tubes required)	Yes	No	No	YES
Adjustable IF Gain Control (prolongs tube life)	Yes	No	No	No

	GENERAL ELECTRIC 10 WATT UNIT	Manufacturer A	Manufacturer B	Manufacturer C
Number of Tubes	22	26	27	22
Cost per Set of Tubes	$32.77	$43.58	$37.46	$38.98
Less than 5 amps standby battery drain @ 6.3v	Yes	No	No	Yes
Less than 20 amps transmit battery drain @ 6.3v	Yes	No	No	No
Spurious Radiation at any frequency	70 db	60 db in the band only	60 db	60 db
Cable Junction Box	Not Required	Required	Not Required	Not Required
Key Lock for Protection of Every Unit	Yes	Optional at Extra Cost	Not Available	Not Available
Microphone Quick Release Plug	Yes	Not Available	Not Available	Yes
Built-in Low Pass Harmonic Filter	Yes	No	No	No
At Least 95 db Attenuation of Spurious Receiver Response	Yes	Yes	No	No

MAIL THIS COUPON TODAY !

General Electric Company, Section AA-1
Electronics Park — Syracuse, New York

I want to know more about the new G-E low-cost radio communication equipment. Send me complete details.

NAME_____

TITLE_____

ADDRESS_____

CITY_____ STATE_____

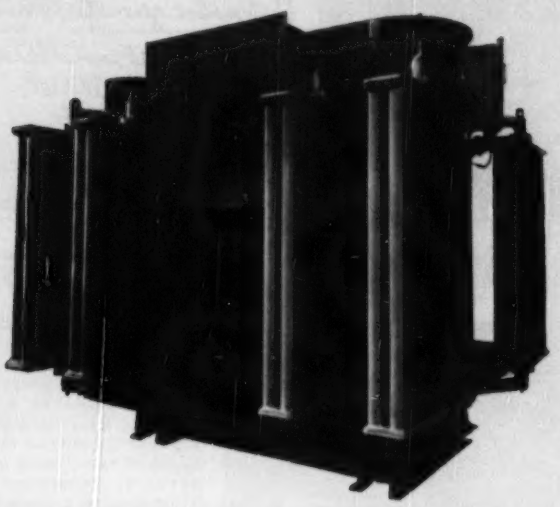
You can put your confidence in...

GENERAL ELECTRIC

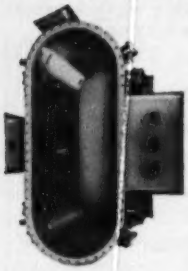
X58-024

Printed in U.S.A.

How KUHLMAN has YOU in mind in building Power Transformers

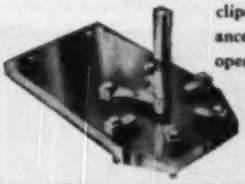


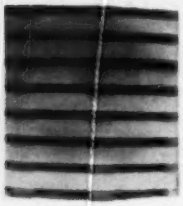
Kuhlman Power Transformers are not merely built — they are engineered! Kuhlman has had 55 years experience designing and building power transformers to meet the requirements of utility and industrial customers. These transformers have earned a high reputation for efficiency and reliability through the use of Kuhlman's proved and accepted design principles. Below is a revealing look inside a Kuhlman Power Transformer.



Rigid sturdy construction: Structural steel clamps hold the core securely — prevent shifting and vibration, provide support for coil braces, and center the transformer in the tank. The tank itself is made of heavy steel plate with all seams electrically welded and has a thoroughly protected surface. All bushing bosses and openings have smooth gasket surfaces and provision for external bolts.

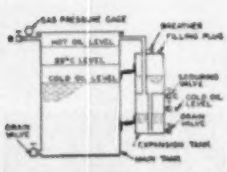
A typical result of the constant search by Kuhlman engineers for new materials, new designs, and new manufacturing methods is the new Kuhlman tap changer. This tap changer features high overload capacity at low temperature rise on contacts, low contact resistance, self-aligning spring clips on rotary blades, ample clearance at all points of voltage stress, operation by an external handle, and a plainly marked dial which assures locking handle in desired position with the handle locked by pin.





Thorough Protection: Kuhlman coils below 25 KV are assembled, dried under heat and vacuum, immersed in a thermo-setting, polymerizing-type varnish, and then baked. For voltages above 25 KV, varnish treatment is replaced by oil impregnation under vacuum. Kuhlman maintains a complete testing laboratory equipped to make every conceivable test on power transformers in accordance with E.E.I. NEMA standards.

More detailed information on Kuhlman Power Transformers may be had by writing for the new Bulletin CS-601. Kuhlman also manufactures a complete line of Distribution, Dry Type, Street Lighting, and Specialty Transformers. Bulletins on any type of Kuhlman Transformer are available on request.



Gas-oil-seal tanks are standard on transformers above 2000 KVA, voltages above 46 KV and optional on other ratings at no extra cost. In this system, an auxiliary tank is divided into two compartments containing oil and allowing expansion and contraction of the gas in the transformer tank under all conditions of loading and temperature.

EXPERIENCE COUNTS—THIS IS OUR 56TH YEAR

Kuhlman

KUHLMAN ELECTRIC COMPANY
BAY CITY, MICHIGAN

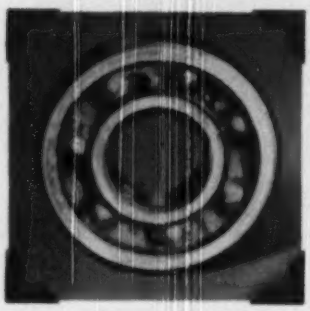
EXPORT REPRESENTATIVES: *International Standard Electric Corporation,* **67 Broad Street, New York 4, N.Y. Cable Address, Microphone, N.Y.**

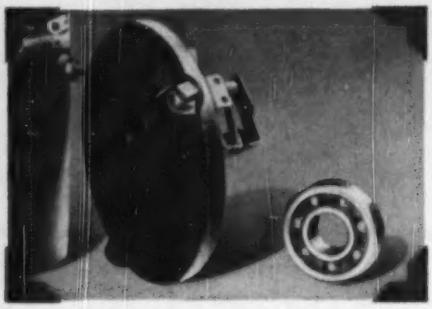
STANDARD ENGINEER'S REPORT

DATA

LUBRICANT Calol O.H.T. Grease
UNIT Automotive generator bearing
LUBRICATOR Sealed at installation
CONDITIONS Heavy-duty diesel truck engine
MILEAGE 70,000
FIRM H. G. Makelim Co., San Francisco—Oakland

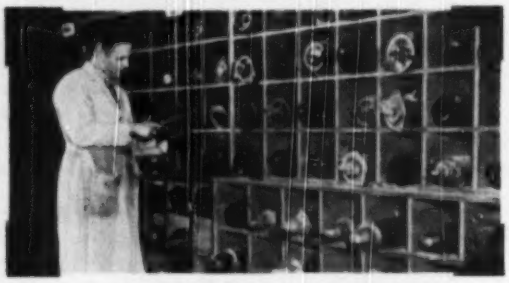
Sealed generator bearing still perfect after 70,000 miles!





ONE APPLICATION OF CALOL O.H.T. GREASE, sealed in the bearings when this diesel-engine generator was assembled by H. G. Makelim Co., prevented any bearing wear in 70,000 miles of heavy-duty truck service. Generator was disassembled at this time only because it needed new brushes, and for general inspection. Note a permanent plug replaces usual grease fitting.

70,000 MILES OF SERVICE did not affect or use up any of the CALOL O.H.T. Grease in the bearings. In special tests, one filling has lubricated bus-generator bearings perfectly for more than 150,000 miles.

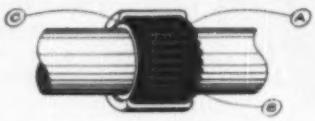


"WITH CALOL O.H.T. GREASE SEALED IN BEARINGS, we recommend installing generators without grease fittings," says Frank Balzarini, H. G. Makelim Co. Foreman. "CALOL O.H.T. eliminates need for greasing between overhauls. And eliminating fittings stops over-greasing—a big cause of wear and trouble."

REMARKS: The H. G. Makelim Magneto Repair Company, San Francisco and Oakland, one of the West's oldest automotive-electrical and carburetor repair firms, specializes in servicing equipment in the toughest automotive service—truck, bus and car fleets.

Besides generator bearings in this service, CALOL O.H.T. Grease is recommended for all types of bearings in service under extremely severe operating conditions.

How CALOL O. H. T. Grease protects bearings in severest operating conditions



Used in any type of bearing under any operating condition, high temperature-low speed, high speeds to 10,000 rpm, temperatures from minus 10° F. to 400° F., CALOL O.H.T. Grease will last indefinitely.

A. Contains special oxidation inhibitor—prevents rusting, corrosion, hardening of grease at any time.
B. Resists high temperatures — eliminates coking.
C. Provides excellent seal against water... lubricates efficiently in slight moisture.

CALOL

STANDARD TECHNICAL SERVICE checked this product performance. If you have a lubrication or fuel problem your Standard Fuel and Lubricant Engineer or Representative will give expert help; or write Standard of California, 225 Bush St., San Francisco 20.

Trademark "CALOL" Reg. U. S. Pat. Off.

STANDARD OIL COMPANY OF CALIFORNIA

SURE.. IF IT'S Westinghouse

IT TAKES SEPARATE UNIT CONSTRUCTION

FOR *Fast Meter Assembly* *

Meters made like this save money. Take one apart. See how it's made. Compare.

Notice how the Westinghouse meter practically assembles itself. There's no adjusting or fitting. The elements are *made* to fit together. That comes from precision manufacture.

And when you reassemble the meter . . . *every unit retains perfect calibration.* Every unit can be replaced in the field. All you need is a few minutes and a screw driver.

That's the story. Meters so perfectly made . . . so dependable their accuracy holds for years and years . . . without bearing replacement . . . even without attention. Your own service records will prove it!

Want more proof? Call your nearest Westinghouse office or write for the new booklet, B-4665, "What It Takes for Long-time, Low-cost Metering." Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa. J-40371

*A VITAL PART OF LONG-TIME, LOW-COST METERING

Westinghouse METERS

NOCRETE
WITHOUT CONCRETE ENCASEMENT

Orangeburg Fibre CONDUIT NEWS

STANDARD
WITH CONCRETE ENCASEMENT

MORE BUSINESS — MORE PROFITS FOR THE CONTRACTOR

VOL. 1 NO. 2 APRIL 1950 ★★★★★

LEADER AND FIRST CHOICE IN EVERY CITY AND STATE!

NOCRETE for One and Two Duct Installations

For single or double duct runs, ORANGEBURG NOCRETE (Type 2) is the *ideal* conduit. Made with heavier walls for installations *without* concrete encasement, *Nocrete* makes possible valuable savings on such installations as — factories, schools, colleges, hospitals, drive-in theatres, power, telephone and other communications systems — also service entrance, parkway and suburban lighting, airport lighting and communication.

NOW BRANDED WITH ORANGEBURG TRADEMARK

DISTRIBUTED BY
Graybar ELECTRIC COMPANY

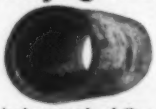
LIGHT, EASY TO HANDLE

. . . and *more workable*. That's why Orangeburg Fibre Conduit is a big help in lowering transportation costs and speeding installation.

CUT AND WORKED ON JOB

Orangeburg can be cut with rough tooth hand saw — drilled or worked with ordinary hand-working tools.

Time Defying Materials



Unretouched photograph of Orangeburg material removed from ground after 41 years. Orangeburg withstands ground waters, acids, oils and alkalies.

MORE ORANGEBURG AVAILABLE

. . . at *more distribution* points through Graybar Electric Company and General Electric Supply Corporation.

ORANGEBURG KEEPS FORGING AHEAD

North, south, east and west Orangeburg Fibre Conduit is the first choice of leading utilities and municipalities, many contractors and practically all design engineers. Orangeburg innovated all the important advancements of the fibre conduit industry — another reason why it's the leader.

When the installation requires duct-banks of four or more ducts, ORANGEBURG STANDARD (Type 1) — installed *with* concrete encasement — is the *preferred* conduit.

JUST A TAP OR TWO

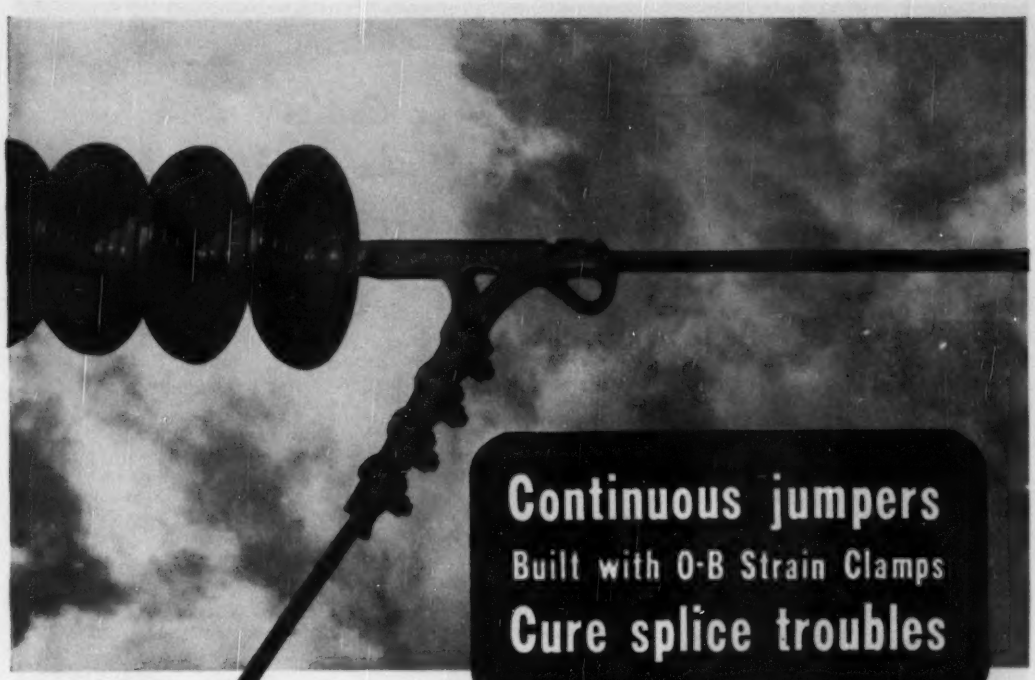
Tapered Sleeve Couplings save a lot of time for the Contractor. A few light taps on the coupling drive it firmly against the shoulder of the conduit. This makes a permanently tight, infiltration-proof joint.

Send for Bend Section Folder

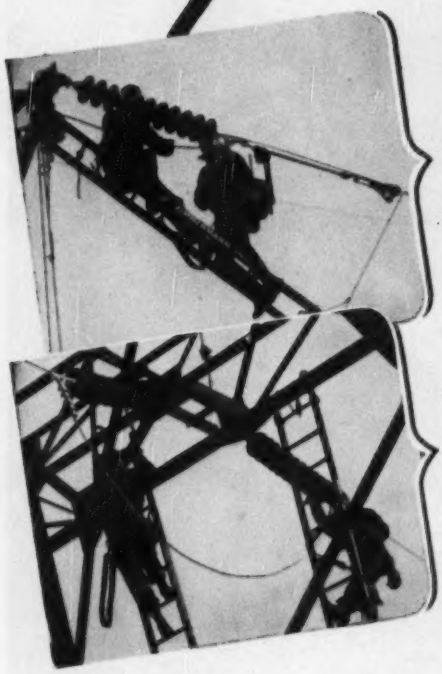
Conduit-line transformation problems like this are greatly simplified by Orangeburg Bend Sections. Illustrated folder — showing various types of Orangeburg Bend Sections and Angle Couplings, their specifications, advantages and applications — sent FREE on request. Write today to Dept. E-4, Orangeburg Manufacturing Co., Inc., Orangeburg, N. Y.

DISTRIBUTED BY
GENERAL ELECTRIC SUPPLY CORPORATION

ORANGEBURG MANUFACTURING CO., INC., ORANGEBURG, NEW YORK



Continuous jumpers
Built with O-B Strain Clamps
Cure splice troubles



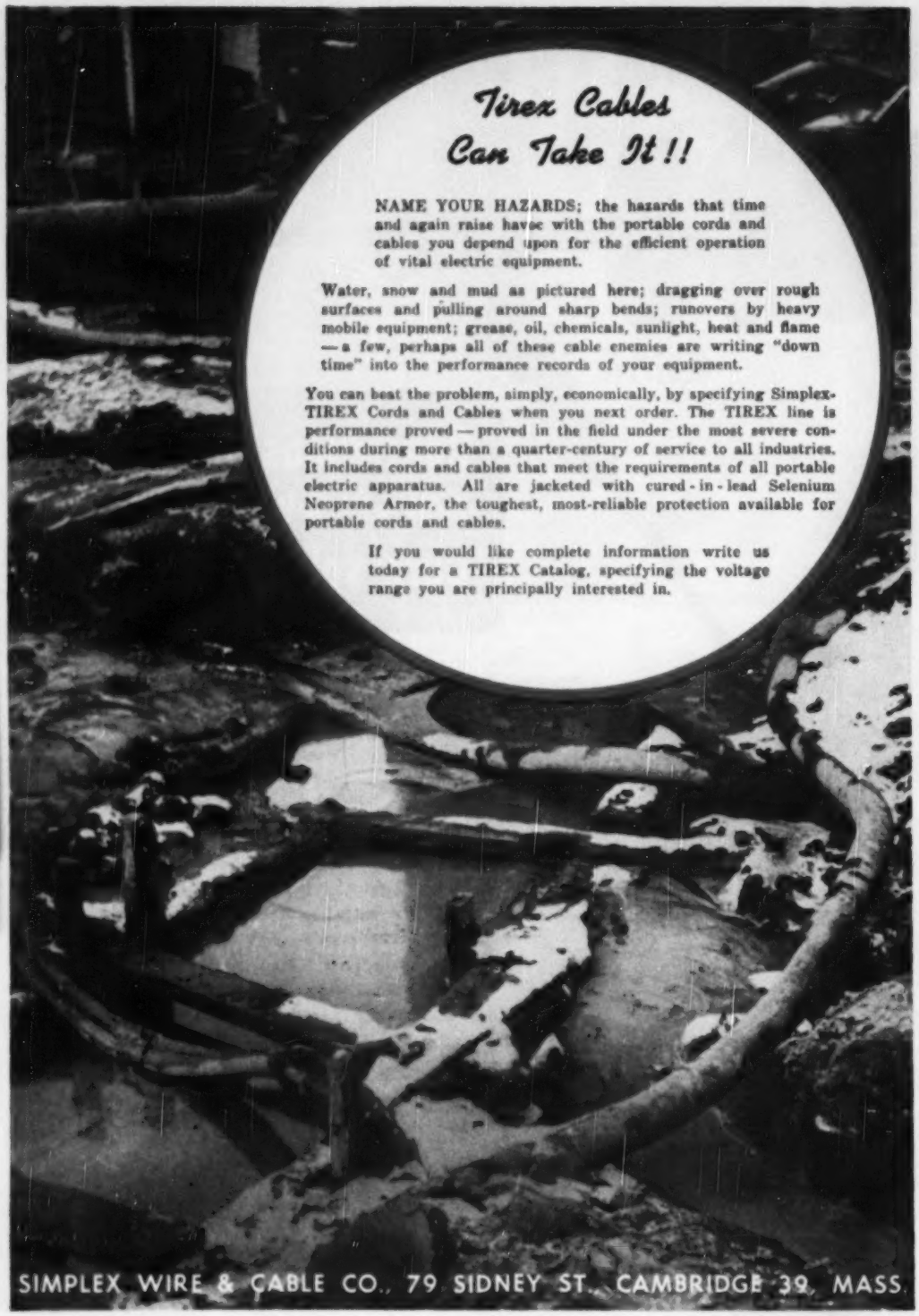
Based upon reported experiences of power companies, untensioned jumper splices ultimately become loosened and corroded, leading to burn-down. This can be avoided by the practice of stringing conductor straight through all strain points, thus producing continuous jumpers and eliminating a serious source of line trouble.

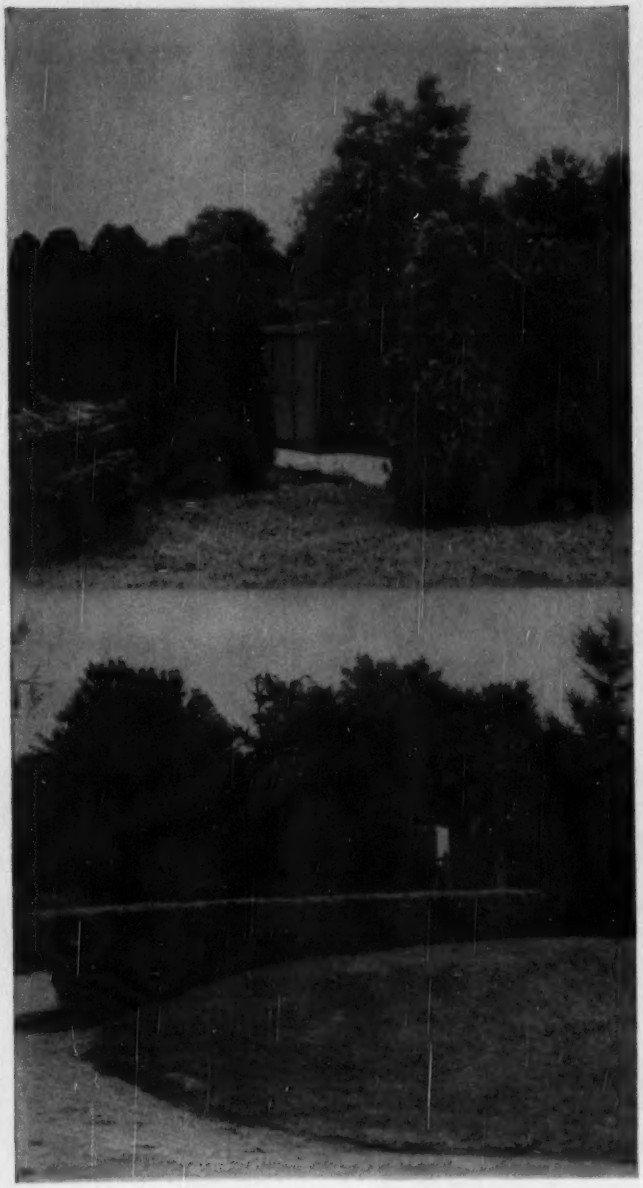
For this purpose the O-B strain clamp is ideal. Its holding power without slip is beyond all permissible conductor tensions. It is easily installed by a two-man crew, without special tools, equipment, or skill. Its attachment is subject to complete inspection at installation and during later maintenance checkups. Its final cost is low, while the value of continuous jumpers in preventing transmission failures can't be computed!

Build your transmission lines with O-B strain clamps to avoid spliced jumpers. Gain the advantage of a permanent low resistance electrical path from terminal to terminal--at a substantial saving in cost.

Ohio Brass

MANSFIELD · OHIO


Tirex Cables
Can Take It!!
NAME YOUR HAZARDS; the hazards that time and again raise havoc with the portable cords and cables you depend upon for the efficient operation of vital electric equipment.
Water, snow and mud as pictured here; dragging over rough surfaces and pulling around sharp bends; runovers by heavy mobile equipment; grease, oil, chemicals, sunlight, heat and flame — a few, perhaps all of these cable enemies are writing "down time" into the performance records of your equipment.
You can beat the problem, simply, economically, by specifying Simplex-TIREX Cords and Cables when you next order. The TIREX line is performance proved — proved in the field under the most severe conditions during more than a quarter-century of service to all industries. It includes cords and cables that meet the requirements of all portable electric apparatus. All are jacketed with cured-in-lead Selenium Neoprene Armor, the toughest, most-reliable protection available for portable cords and cables.
If you would like complete information write us today for a TIREX Catalog, specifying the voltage range you are principally interested in.
SIMPLEX WIRE & CABLE CO., 79 SIDNEY ST., CAMBRIDGE 39, MASS.



THE PROBLEM OF
SUBSTATION APPEARANCE
IN RESIDENTIAL AREAS IS
EASILY OVERCOME WHEN YOU
INSTALL GENERAL ELECTRIC
UNIT SUBSTATIONS . . . .
THEIR INTEGRATED DESIGN
MAKES THEM EASY TO LANDSCAPE
AND THUS OVERCOME
APPEARANCE OBJECTIONS.
ASK YOUR G-E REPRESENTATIVE
FOR BROCHURE GEA-5155
THAT SHOWS HOW OTHER
UTILITIES TOOK ADVANTAGE OF
G-E ENGINEERING AND SERVICE
(TWO EXAMPLES AT LEFT).
OR WRITE TO . . . .
APPARATUS DEPARTMENT
GENERAL ELECTRIC COMPANY
SCHENECTADY 5, NEW YORK.

GENERAL ELECTRIC

With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.

PIONEERS IN CABLE ENGINEERING

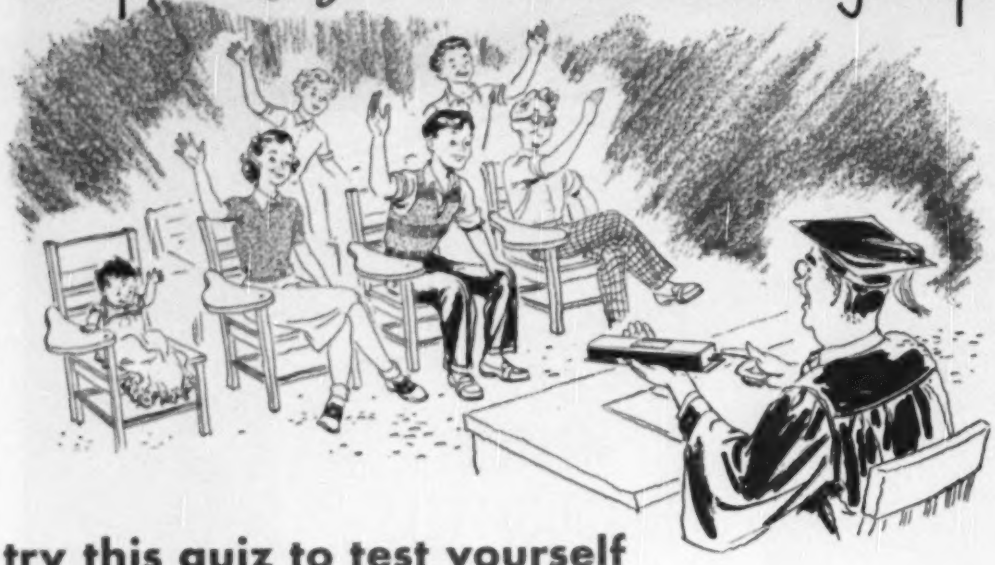
THE KERITE COMPANY

NEW YORK CHICAGO SAN FRANCISCO LOS ANGELES

WESTERN
HEADQUARTERS
FOR LIGHTING
EQUIPMENT
SMOOT-HOLMAN certified lighting equipment is engineered to the highest illumination standards. Efficient, trouble-free performance in commercial, industrial and institutional installations is assured with planned lighting by SMOOT-HOLMAN.
ILLUMINATION EQUIPMENT
SMOOT-HOLMAN
INGLEWOOD, CALIFORNIA
MADE IN U.S.A.

OFFICES IN PRINCIPAL WESTERN CITIES – BRANCH AND WAREHOUSE IN SAN FRANCISCO

Are you a Quiz Kid on Fluorescent Lighting?



try this quiz to test yourself

Q. Is the light output of a fluorescent tube affected by ballast operation?

A. Yes. Some uncertified ballasts reduce light output by 20%! CERTIFIED BALLASTS assure rated light output.

Q. Does the ballast affect lamp life?

A. Decidedly. Improperly designed ballasts can lower lamp life by as much as 1,000 hours in a 40 watt lamp. CERTIFIED BALLASTS assure full lamp life.

Q. How can one guard against overheated ballasts?

A. Use CERTIFIED BALLASTS in well designed fixtures.

Q. Do some ballasts last longer than others?

A. Yes. A CERTIFIED BALLAST should outlast the life of the installation.

Q. Can ballasts be a source of noise?

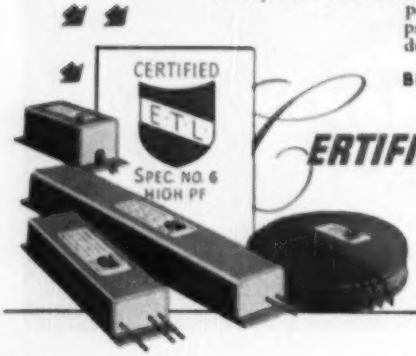
A. Audible "humming" is often due to the ballast. CERTIFIED BALLASTS produce a minimum of noise.

Q. What ballasts are made to exacting specifications, then tested and checked by Electrical Testing Laboratories, Inc., who certify that they conform to these specifications?

A. CERTIFIED BALLASTS!

Q. Who makes CERTIFIED BALLASTS?

A. Any manufacturer who wishes to produce ballasts that meet the specifications may participate in the CERTIFIED BALLAST MANUFACTURERS program. Currently 10 leading ballast manufacturers are producing CERTIFIED BALLASTS.



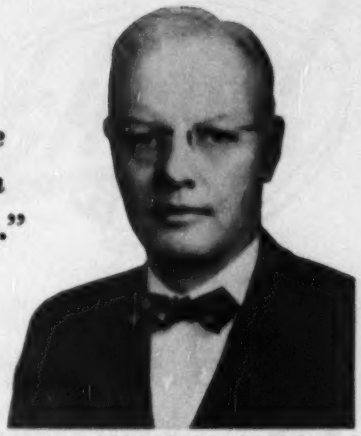
BE SURE... ALWAYS SPECIFY CERTIFIED BALLASTS!

CERTIFIED BALLAST MANUFACTURERS

Makers of Certified Ballasts for Fluorescent Lighting

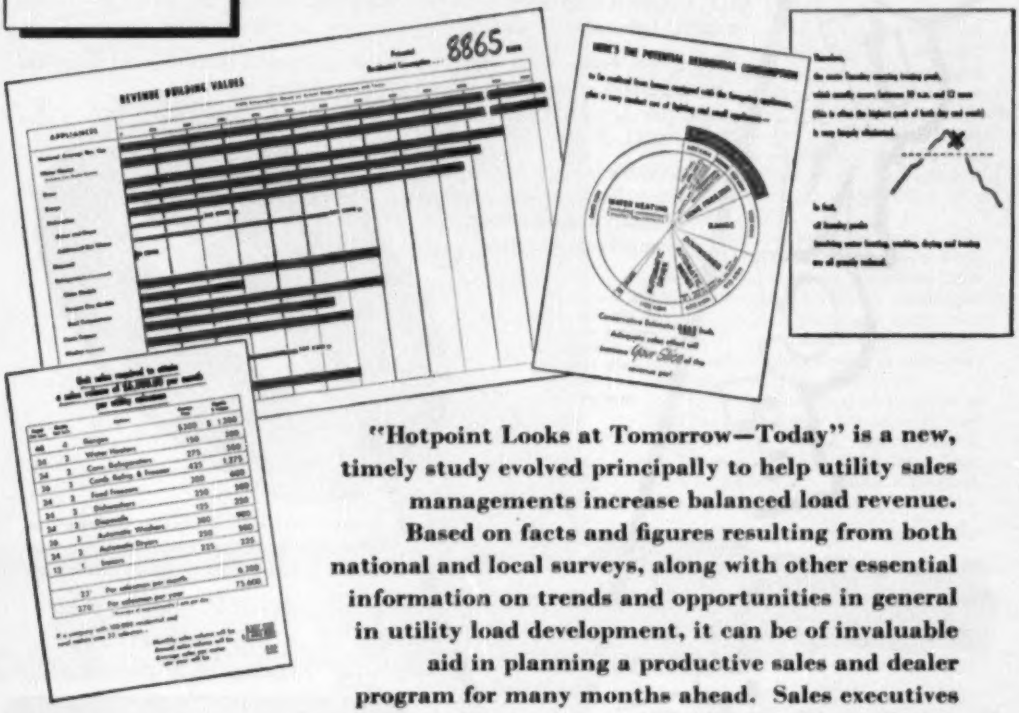
2116 KEITH BLDG., CLEVELAND 15, OHIO

"...an excellent guide in helping to solve the many load balancing problems which undoubtedly confront most utilities today."



SUTHERLAND DOWS
President, Iowa Electric Light and Power Co.,
Cedar Rapids, Iowa

Thanks, Mr. Dows—it was planned largely for that particular purpose.



"Hotpoint Looks at Tomorrow—Today" is a new, timely study evolved principally to help utility sales managements increase balanced load revenue. Based on facts and figures resulting from both national and local surveys, along with other essential information on trends and opportunities in general in utility load development, it can be of invaluable aid in planning a productive sales and dealer program for many months ahead. Sales executives interested in having an individual or group presentation of this study made are requested to contact the Hotpoint Utility Division, Hotpoint, Inc., 5600 West Taylor Street, Chicago 44, Illinois.

Hotpoint Inc.
(A GENERAL ELECTRIC AFFILIATE)

IT WON'T BREAK
if it's a new
O.Z.
ALL-BAKELITE BUSHING!

BOUNCE IT

Bounce an O. Z. All-Bakelite Insulating Bushing hard, on a concrete floor—it rebounds good as new. Add to its superior strength* these extra features and you've got a bushing that's best by any test!

- **Smooth rounded edges completely protect wire insulation during pulling and when in service.**
- **Clean, deep threads let you spin-on the bushing with a twist of the wrist.**
- **Ribbed outer surface provides a grip for slippery hands and permits tapping with a screw-driver.**

O. Z.'s New All-Bakelite Insulating Bushings are fully approved by Underwriters' Laboratories, meet all requirements of the National Electric Code.

Try a few, bounce 'em, treat 'em rough and you'll be convinced there are no all-Bakelite bushings better suited to the job . . . none so economical to use as O. Z.'s.

Available in sizes from ½ inch to 6 inches, cost no more than ordinary Bakelite bushings. Samples on request.

*56% stronger over all than all other leading all-Bakelite bushings actually tested by an independent laboratory.

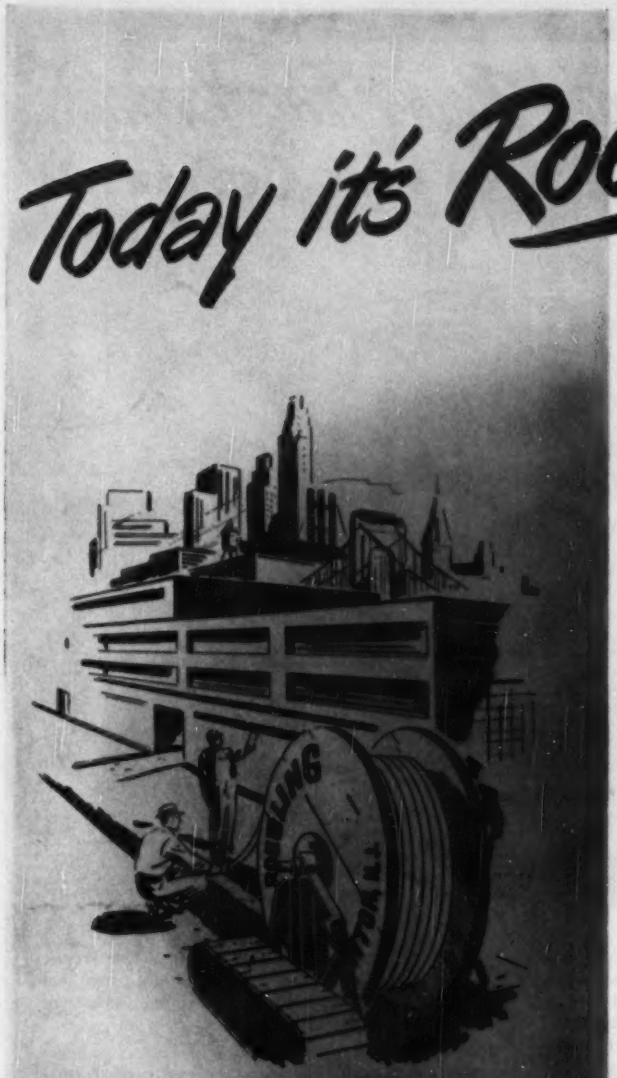
CONDUIT FITTINGS • CABLE TERMINATORS
CAST IRON BOXES • GROUNDING DEVICES
SOLDERLESS CONNECTORS • POWER CONNECTORS

Buy O. Z. and you'll see why Engineers say, "They're OK if they're O.Z."

O.Z. ELECTRICAL MANUFACTURING COMPANY, INC.
262 BOND STREET BROOKLYN 2, N. Y.

4899

Today it's Roebling!

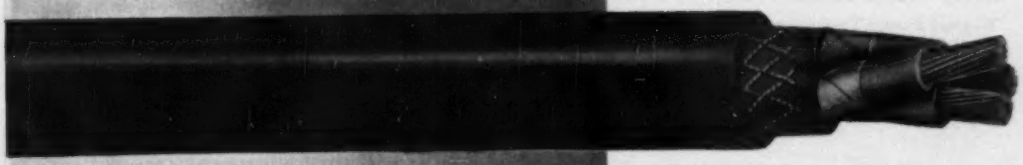


Why men who watch costs specify Roebling ROEPRENE Parkway Cable

THERE'S ONE BIG and deciding reason for choosing Roebling ROEPRENE Parkway Cable . . . it enables you to avoid the expense of underground duct systems! This cable is made for direct underground installation. Only a two- or three-foot trench is needed. And as soon as the cable is out of sight, you can put it out of mind. There'll be no service troubles from wind or weather . . . safe physical protection is assured by the non-metallic armor of a ROEPRENE sheath.

Roebling ROEPRENE Parkway Cable has rapidly become a top choice for series street lighting, parkway boulevard lighting, traffic signal, fire alarm, flood lighting, railroad yard, signal and many other circuits. It is available in single and multiple conductor types—solid or stranded—in a range from 600 to 5,000 volts.

Have your Roebling distributor or Roebling branch office help select the best cable for your special needs. John A. Roebling's Sons Co. of Calif. — San Francisco — Los Angeles — Seattle — Portland.



From copper rod to finished cable all components of Roebling electrical wires and cables are manufactured in Roebling's own plants. Painstaking care, research, engineering and modern precision machines are your assurance of highest quality.

ROEBLING

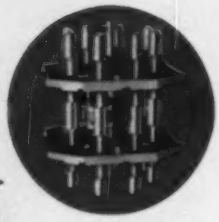
A CENTURY OF CONFIDENCE

Atlanta, 934 Avon Ave. * *Boston*, 51 Sleeper St. * *Chicago*, 5525 W. Roosevelt Road * *Cincinnati*, 3253 Fredonia Ave. * *Cleveland*, 701 St. Clair Ave., N. E. * *Denver*, 4801 Jackson St. * *Houston*, 6216 Navigation Blvd. * *Los Angeles*, 216 S. Alameda St. * *New York*, 19 Rector St. * *Philadelphia*, 12 S. Twelfth St. * *Portland*, 1032 N. W. 14th Ave. * *San Francisco*, 1740 Seventeenth St. * *Seattle*, 900 First Avenue S.

Wagner Power Transformers

BUILT FOR LONG LIFE SERVICE

Wagner Power Transformer Elements are particularly outstanding because of their inherent strength and stability and because of their compact design and careful construction. They have sufficient capacity to not only carry their normal load but to be able to handle an overload when the emergency arises. That's why Wagner Transformers have established records for continuous service and long life in all types of industrial plants and transmission lines.



Snap acting rotary type tap changers, designed to permit changing the voltage ratio quickly and effectively, are located near the taps and are connected for gang operation from a single operating handle outside the tank.

Any transformer you buy comes to you with a number of specified, generally standardized, accessories. Your primary requirement in a transformer, however, is the safe transformation of electrical power upon which you can rely. Whether this need is satisfied depends entirely upon the materials used and upon the design and construction of the transformer element inside the tank.

Wagner Power Transformers will meet your primary requirements because they are liberally designed and built using carefully controlled construction methods, highest quality material, and are rigidly inspected and tested.

Field performance is the real proof — Our service records date back to the early 1900's and prove that Wagner Power Transformers give many years of dependable, economical service.

Users of power transformers will find it to their interest to consult Wagner on their next transformer installation. Twenty-nine branch offices, located in principal cities and manned by trained field engineers, are at your service for consultation on your transformer problems and offer speedy, nation-wide service facilities. Bulletins TU-180 and TU-181 give information on the complete line of Wagner Power and Distribution Transformers.

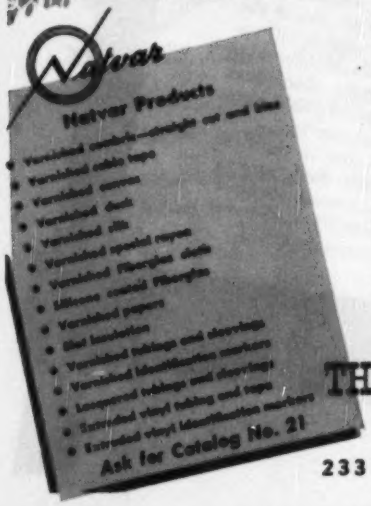
WAGNER ELECTRIC CORPORATION
6381 Plymouth Ave., St. Louis 14, Mo., U.S.A.

Wagner Electric Corporation
EST. 1891

ELECTRIC MOTORS • TRANSFORMERS • INDUSTRIAL BRAKES
AUTOMOTIVE BRAKE SYSTEMS — AIR AND HYDRAULIC

BRANCHES IN 29 PRINCIPAL CITIES

ANCE
NATVAR
GERM
SWITZERLAND
This 3125 KVA generator, 5750 volt, 3 phase, is typical of the large generating equipment built by Brown Boveri & Cie., A.G., in Baden, Switzerland. Natvar varnished cambric and varnished cambric tape were used in its manufacture.



Continued demand for a product in a free market is strong proof of its *value*. Where the demand persists in spite of economic difficulties, it is also evidence of superior *quality*. In Switzerland, and other markets throughout the world, preference for Natvar insulating materials is steadily increasing.

Natvar insulations give dependable performance because they are skillfully made of the best materials available. They are always the same no matter when or where purchased.

Delivery can be promptly made either from conveniently located wholesaler's stock, or direct from our own.

Represented by Electrical Specialty Co.

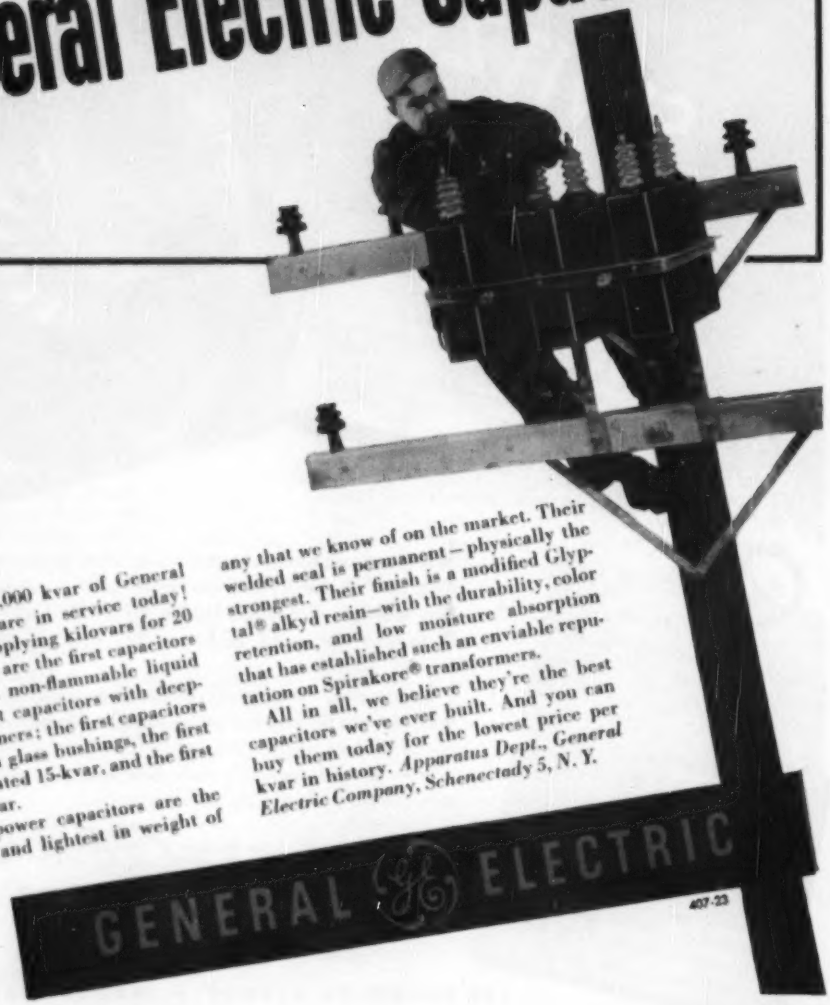
San Francisco 3, 316 Eleventh St. · Los Angeles 13, 418 East Third St. · Seattle 1, 2406 First Ave. · Denver 2, 1015 21st St.

THE NATIONAL VARNISHED PRODUCTS Corporation

TELEPHONE RAHWAY 7-8800 · CABLE ADDRESS NATVAR: RAHWAY, N. J.

233 RANDOLPH AVENUE ★ WOODBRIDGE, NEW JERSEY

10,000,000 kilovars prove you can depend on General Electric Capacitors



More than 10,000,000 kvar of General Electric capacitors are in service today! Some have been supplying kilovars for 20 years. Among them are the first capacitors to be filled with a non-flammable liquid dielectric; the first capacitors with deep-drawn steel containers; the first capacitors to have welded-on glass bushings, the first capacitors to be rated 15-kvar, and the first to be rated 25-kvar.

Today's G-E power capacitors are the smallest in size and lightest in weight of any that we know of on the market. Their welded seal is permanent—physically the strongest. Their finish is a modified Glyptal® alkyd resin—with the durability, color retention, and low moisture absorption that has established such an enviable reputation on Spirakore® transformers.

All in all, we believe they're the best capacitors we've ever built. And you can buy them today for the lowest price per kvar in history. *Apparatus Dept., General Electric Company, Schenectady 5, N. Y.*

With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.

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* Please include your company's name and your position, since we cannot ask manufacturers to furnish literature unless you do.

ELECTRICAL WEST

Reader Service

The editors of Electrical West will be glad to answer questions on engineering techniques; in the lighting and wiring fields; on the electrical code; on merchandising and appliance markets and other phases of the electrical industry in the eleven Western states.

Dear Editor:

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a "live wire" for hot spots

Vitrotex* Magnet Wire with Glass Fiber Insulation withstands temperatures of 130°C.

Highly Flexible . . . Amazing Space Factor — made possible by insulation of alkali-free glass, the insulation that's soft as silk and strong as steel!

High Dielectric Strength and Smooth Surface . . . resists moisture, acids, oils and corrosive vapors!

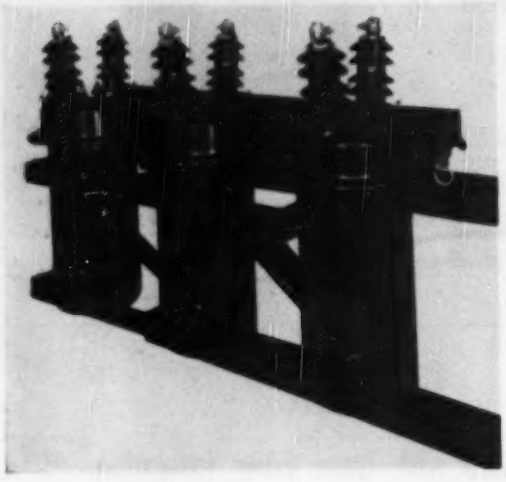
Vitrotex Windings Give Tighter, Safer Coils — for operation in confined spaces under high heat!

Ask the Anaconda Sales Office nearest you for complete information on the entire ANACONDA *Magnet Wire Line. Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y., or 20 N. Wacker Drive, Chicago 6, Ill.*

*Reg. U. S. Pat. Off.

The right wire for the job **ANACONDA®**
WIRE AND CABLE

PRODUCT NEWS



Illuminated Fish Attractor

(2) Electric Fish Screen Co., Hollywood 46, Calif. Supplement to the manufacturer's electric fish screen, this device uses moving light to direct fledgling salmon from diversion back to main channels. Three types of lighting are being used: a string of moving lamps, like a clothesline; a chain of stationary lights, progressively illuminated to give the illusion of movement; a revolving searchlight turned toward the water's surface. All three types are used alone or with the fish screen. A typical installation across a diversion channel is shown below. Cables upon which light rides act both as support and power line. An electronic solar relay automatically turns on the unit when darkness approaches. Tests of the device directed by Donald E. Fry Jr. of the California Bureau of Fisheries are said to show that light has more positive allure for fish than electric shock warning devices.

Three-Phase Automatic Recloser

(1) General Electric Co., Apparatus Department, Schenectady 5, N. Y.

This 3-phase automatic recloser with maximum service ratings of 100 amp., 15,000 volts is designated type FR-3; combines three FR-1 single-phase reclosers in a single unit. The new recloser is designed primarily for rural distribution systems and has a short-circuit interrupting capacity of 3,000 amp. It is claimed to be safer in operation and easier to maintain.

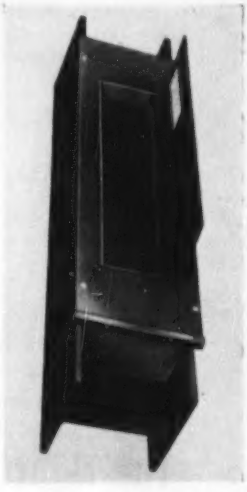
Eliminating the hazard of burning out 3-phase loads by having only one phase lock-out, the units employ a common linkage claimed to assure positive operating in locking-out all three phases whenever a permanent fault occurs. When the fault is cleared, a single resetting operation may close all three circuits. However, the three units operate as single-phase reclosers whenever an intermittent fault occurs.

Constructed to use three separate, instead of one big, tank, possibility of phase-to-phase failure is greatly reduced, according to the manufacurer, who also states that interchangeable parts with the FR-1 cut maintenance costs.

Lighting Panelboards Fit 8-in. Beams

(3) Square D Co., 6060 Rivard St., Detroit 11, Mich.

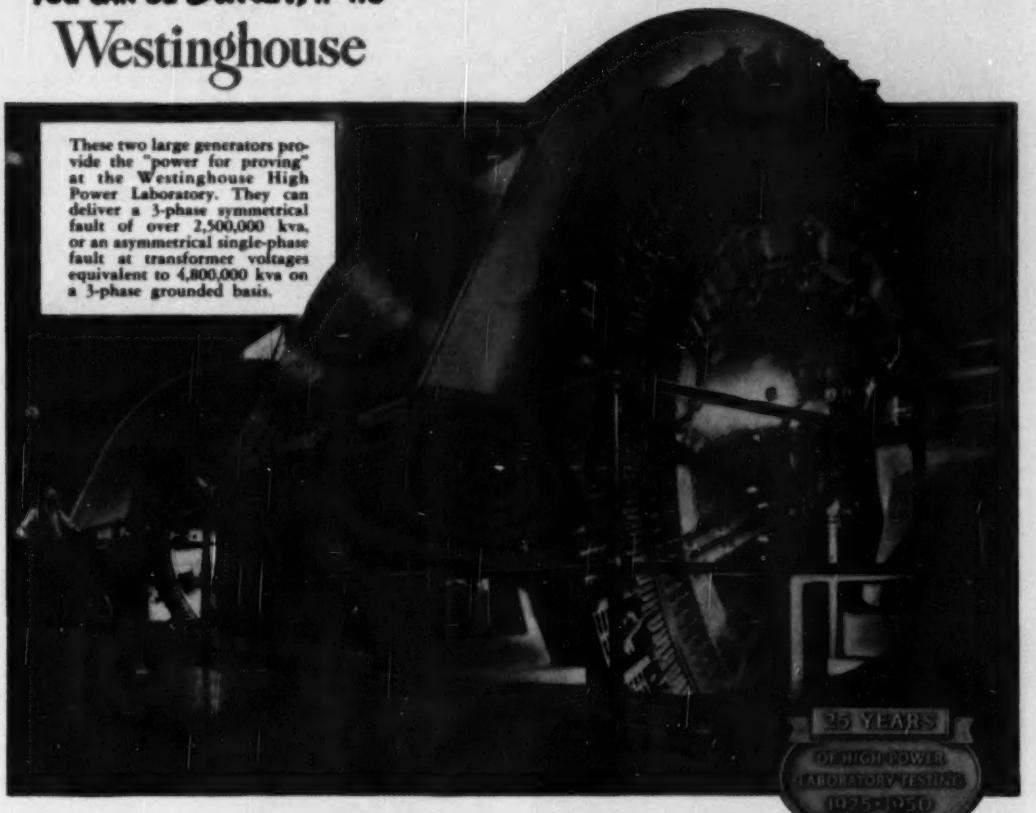
A line of narrow-width NMO-XX circuit breaker lighting panelboards was designed to fit into the web of 8-in. wide-flange structural beams. The panelboard incorporates thermal-magnetic circuit breaker units that "plug in" on cylindrical bus bars and are interchangeable with those of the NMO panelboards, MO panelettes and MO-12 and MO-20 load centers. MNO-XX "plug in" narrow width panelboards are available in single-phase, 3-wire and 3-phase, 4-wire services with 15-, 20-, 30-, 40- and 50-amp. branch circuits.



(4) The Tal Handy-Bendy is claimed to make instantaneously any number of uniform bends in any desired degree, including offsets in ½- and ¾-in. rigid, EMT thin-wall or aluminum conduit. Weight is 30 lb. Manufactured by Tal Bender Inc., Milkwaukee, Wis.

YOU CAN BE SURE.. IF IT'S

Westinghouse



These two large generators provide the "power for proving" at the Westinghouse High Power Laboratory. They can deliver a 3-phase symmetrical fault of over 2,500,000 kva, or an asymmetrical single-phase fault at transformer voltages equivalent to 4,800,000 kva on a 3-phase grounded basis.

Here's *POWER* for proving it

Many electrical products are required to interrupt heavy currents under fault conditions . . . carry great amounts of current for a short time . . . perform consistently under repetitive short-circuit conditions. Oil circuit breakers, air circuit breakers, reactors, disconnecting switches, transformers, and many other pieces of electrical apparatus come under this classification.

That is why, 25 years ago, Westinghouse installed its High Power Laboratory at East Pittsburgh. We wanted to be sure that every piece of apparatus bearing the Westinghouse name was designed to function properly under short-circuit conditions.

In this High Power Laboratory we have the equipment to do this . . . huge generators to develop fault currents that match those of the country's largest electrical systems, transformers that produce short-time currents to test apparatus for momentary current rushes. This is how we make *sure*...and this sureness is passed along to you.

SEE FOR YOURSELF!

Booklet B-4383 describes facilities, procedures and actual tests conducted at the Westinghouse High Power Laboratory. Ask your Westinghouse representative for a copy, or write directly to Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-60722

Westinghouse

HIGH POWER
LABORATORY

Tool Belt With Sliding Trace

(5) Mathias Klein & Sons, 3200 Belmont Ave., Chicago, 18, Ill.

A tool belt with a sliding trace is claimed to give maximum safety and increased comfort and convenience. It has a full floating, sliding trace of company's Klein-Kord claimed to permit free movement in either direction. The sliding trace is designed to eliminate much of the chafing experienced with conventional belts and to reduce wear on the safety strap. An additional safety factor permits visual inspection of the sliding trace throughout its entire length. Buckle and Dee rings are tested to 1,500 lb.

Molded Rubber Heating Pad

(6) Thermo-Mat Co., Los Angeles.

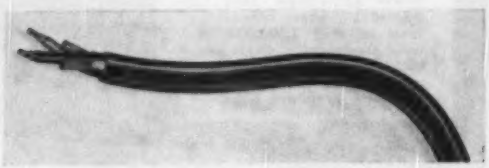
Built originally for protection of workers in machine operations on cold floors, this electric foot warming mat is recommended by the manufacturer for other uses. It is of molded rubber; is thermostatically controlled; operates on 110-120 volts; measures 14x22x5/32 in.; has 6-ft. cord.

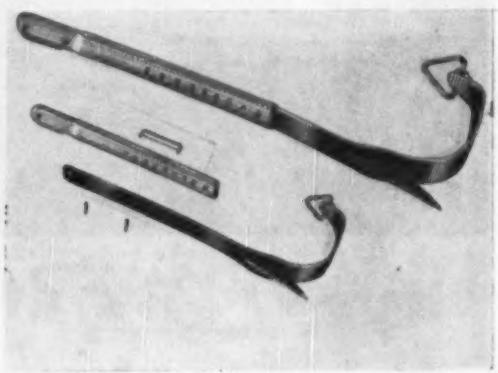
(7) This Videolite is claimed to illuminate an entire room but to diffuse rays away from television screen aera. It attaches to the back of the receiver and is equipped with transformer to eliminate set interference. Light is manufactured by American Lighting Equipment of California.

Neoprene Certified Jackets

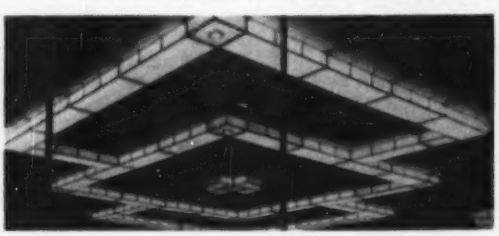
(8) Western Insulated Wire Co., 1001 E. 62nd St., Los Angeles, Calif.

Portable electrical cords and cables with jackets certified to contain not less than 60% by weight of new Neoprene have been introduced by a Western company. Features claimed by the manufacturer are: longer-aging characteristics, greater resistance to oil, ultraviolet, ozone, abrasion, heat cold and flame. According to the manufacturer, artificial aging tests indicate that, after ten years service, the certified jacket will have greater tensile strength than most new portable cord and cable jackets. It is also stated that the 60% compound is more resilient, making the cable on which it is used more flexible. The Bronco 60 line consists of one to eight conductor cords and cables in a wide range of sizes. Types OSJ, OSV, drive-in theater and RR cables are included.





(9) Climbers added to the Klein line are adjustable to 15, 15½, 16, 16½, 17, 17½ and 18 in., in the same patterns as the standard climbers. It is claimed that they can be adjusted easily to compensate for any changes in footwear thickness, such as addition of overshoes in winter. Mathias Klein & Sons, 3200 Belmont Ave., Chicago 18, Ill.



(10) Companion to the 4-lamp Module lighting system introduced in July, this two lamp system is identical in design and appearance and permits many uses. It is a product of Mitchell Mfg., Co. 2525 Clybourn Ave., Chicago.

Do the Job Better – Install

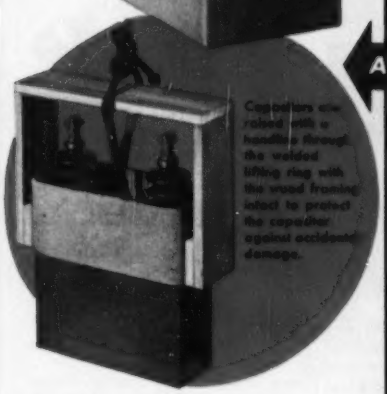
KEARNEY

SHUNT CAPACITORS

WITH THESE IMPORTANT ADVANTAGES

1. Designed to fit all standard mounting racks. Permits replacement and interchangeability.
2. Extra heavy wet process porcelain bushing securely anchored to the case with silicone gaskets sealed in thermosetting compound.
3. Welded sheet steel case with hot zinc spray and enamel coating provides double protection and greatly reduces maintenance cost.
4. Kearney capacitors are built to NEMA specifications and are guaranteed for one year against defective material and workmanship

AND



5 The Exclusive Kearney
PROTECTIVE PACKAGING FEATURE

The loss of vacuum, because of damage to the bushing through careless handling, is the greatest single factor that causes faulty operation of a capacitor. Kearney's protective packaging eliminates this possibility. The wooden frame and corrugated box protects the capacitor from the moment it leaves the production line at the factory until it is safely installed in its rack on the crossarm.

Hand-holds in the carton are a practical convenience for storekeepers or linemen in handling capacitors.

In or out of the carton, capacitor bushings are protected against damage. The entire weight of the capacitor is carried by the wood framing.

JAMES R. KEARNEY CORPORATION
4224-42 CLAYTON AVENUE • ST. LOUIS 10, MISSOURI

Canadian Plant: Guelph, Ontario
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Better Construction – *SAFER* Maintenance

...for all
HIGH VOLTAGE NEEDS
call
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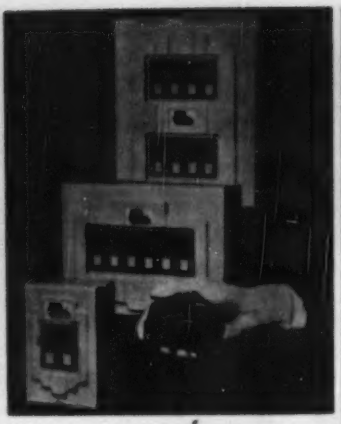
Rugged 6" Suspension Insulators—compression glazed for extra mechanical strength. Designed to withstand strain of wind and ice loads.

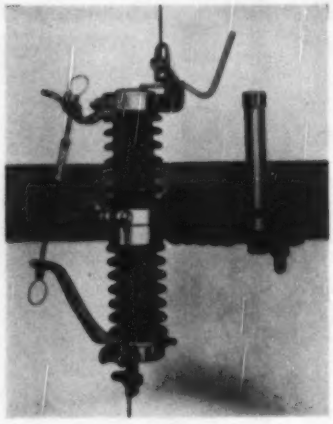
Pinetypes that take a load off lineman's shoulders. Can be furnished with Type "N" radio interference eliminating glaze.

Rugged metal-reinforced wireholders with well rounded wire ways, heavy galvanized steel strap. Semi-float self-aligning action assures proper seating.

SEND YOUR INQUIRY TO
Porcelain Products, Inc.
PARKERSBURG, W. VA.

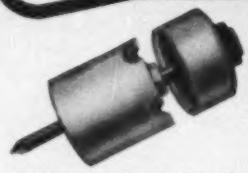


(11) A new line of load centers claimed to give savings in space and ample wiring room comes in models for 2, 4, 6 or 8 circuits. They accommodate the new smaller, fully magnetic circuit breaker, made in 10 through 50-amp. capacities. Additional information may be secured from Murray Mfg. Corp., 1250 Atlantic Ave., Brooklyn 16, N. Y.

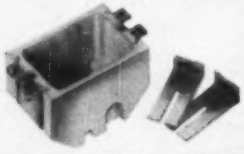


(12) Lighting and/or short circuit and overload protection on rural lines is is claimed to be given at low cost with the Protectogap-Protectolink combinations. By grounding the expulsion gap assembly rather than the hanger, birds or animals are prevented from shorting out the device. The expulsion gap has high impulse values and is ahead of the fuse link to reduce the number of fuse outages from lightning. These units are available in the following ratings: 5 kv., 50 amp.; 7.5 kv., 50 amp.; 15 kv., 50 amp. Interrupting capacity of Protectogap assembly, 8,000 surge amp., 1,200 amp., 60 cycle follow current. May be supplied for mounting directly on transformers. Made by W. N. Matthews Corp., 3850 Delor St., St. Louis 16, Mo.

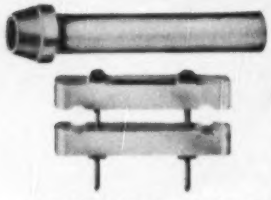
...and for
LOW VOLTAGE TOO!
call
Porcelain Products



Dense, good looking, positive gripping ALLIGATOR Nail Knobs are preferred by electricians insisting on workman-like installations to build good-will and repeat business.



Outlet boxes with Adjustable Metal Mounting lugs and set of Hangers are nationally famous for durability, ease of installation and safety features.



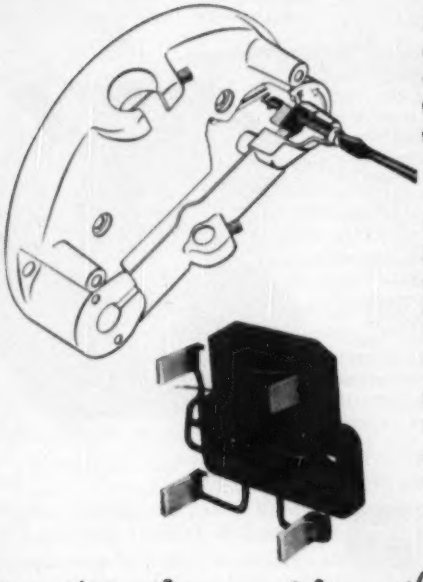
A complete size range of tubes as well as 2 and 3 wire cleats are available for immediate delivery. Made precisely to give long and satisfactory performance.

Both round and oval type split for-estry insulators as well as telephone insulators are available for immediate delivery.

SEND YOUR INQUIRY TO
Porcelain Products, Inc.
FINDLAY, OHIO

Be thrifty—use the I-50

THERE'S LESS TO ADJUST!



A fraction of a dollar spent on watthour-meter adjustment—multiplied by the number of meters you own—can add up to a sizable unnecessary expense. With the I-50, exacting factory tests provide correct calibration, and unit construction assures that this calibration will be maintained. Here's how:

Permanent, stable characteristics reduce the need for service adjustments to extremely narrow limits. A refined micrometer adjustment provides all the range ever needed. Conventional meters, with more chances for error, require larger ranges and coarser adjustment.

Unlike conventional meters, no adjustments need be made for lagging power factor, thus none is provided for. The exclusive unit construction of the electromagnet—with all parts *permanently* fixed in place—makes a permanent factory adjustment of the lag plate possible.

time to retire ... old watthour meters?

It may cost you more to keep an old watthour meter in service than to replace it with a modern I-50. Here are the reasons:

1. LOSS IN REVENUE AT INCREASED LOADS
2. EXCESSIVE OPERATING EXPENSE
3. HIGH COST OF REBUILDING AND MODERNIZING

Adopt the I-50—today's most modern meter—as your *standard*. It *earns* more—by accurate overload registrations. It *saves* more—by its design for fewer adjustments, less maintenance. Ask your G-E representative for full information. *Apparatus Dept., General Electric Company, Schenectady 5, N. Y.*

GENERAL ELECTRIC

603-15

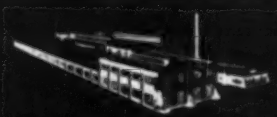
With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.

Buy
YOUR GENERATOR AND MOTOR BRUSHES
from a
SINGLE SOURCE

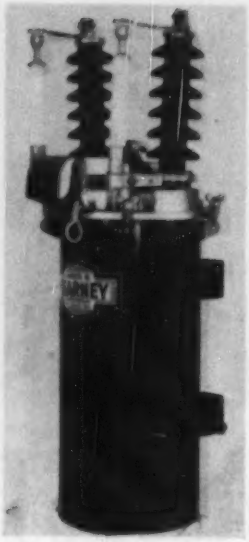
HERE'S WHY

Our organization develops and manufactures brushes from the raw material to the finished product. Although we carry standard items in stock, we also maintain a complete engineering staff to assist you in the selection and application of correct brushes for your equipment. We base our 30 years of reputable existence upon our SERVICE to INDUSTRY. Try Ohio for your brush requirements.

West Coast Representative
C. F. BOWERS
544 S. San Pedro St., Los Angeles, Cal.



THE OHIO CARBON CO.
12508 BEREA ROAD
CLEVELAND 11, OHIO

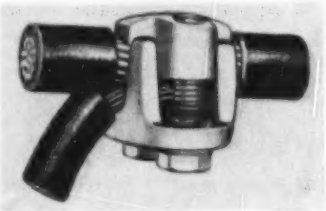


Oil Circuit Recloser

(13) James R. Kearney Corp., 4236 Clayton Ave., St. Louis 10, Mo.

Recloser protection for 24,950 Grd. Y/14,400-volt rural systems is given in this newly developed 25-kv. oil circuit recloser. Larger bushings, 8-gal. oil capacity and increased internal electrical clearances provide extra insulation for use on 15-kv.-to-ground single-phase circuits.

Time-current characteristics are identical to those of 15-kv. units. Two-coil operation, control of opening and reclosing times by a mechanical escapement, trip-free operating handle for picking up load are also incorporated. Two expulsion arresters are provided. Unit is available in current ratings of 5, 10, 15, 25, 35 and 50 amp.



Two-Bolt Clamp Connector

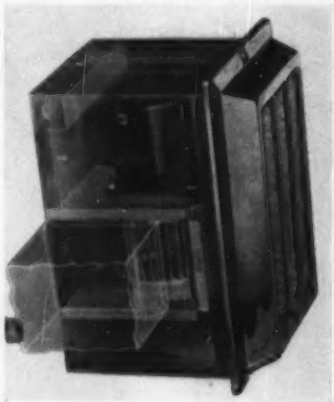
(14) Penn-Union Electric Corp., Erie, Pa.

A heavy-duty 2-bolt clamp connector, the Penn-Tap, has been announced for taps and splices, service entrance connections, dead ends, etc., indoor or out. According to the manufacturer, it is quickly installed with an ordinary wrench and is self-locking. Underwriters' listed, it is a one-piece fitting without loose parts, swiveling on one locked bolt. Recessed bolts make for easy taping. Seven sizes take cables from 10 str. to 1,000 MCM.

Conduit Locknuts

(15) Buchanan Electrical Products Corp., 1290 Central Ave., Hillside, N. J.

Buchanan locknuts are now available for all 14 standard sizes of rigid electrical conduit from ⅜ to 6 in. Sizes ⅜ through 1 in. are fabricated of heavy-gage stamped steel; 1¼ in. and larger of tough malleable iron. All sizes are heavily cadmium plated to resist corrosion. Underwriters' approved.



Filter Fan

(16) Marvin Mfg. Co., 3071 E 12th St., Los Angeles 23, Calif.

The Marco Filter-Fan, now in production for home and apartment uses, consists of two main units: a washable filter and a contrifugal blower. The lifetime filter in the base of the fan traps grease and dirt before it reaches the mechanical parts of the fan itself; is said to minimize fire hazard and eliminate grease drippings. The 14⅝x 10½ metal filter is removable for washing.

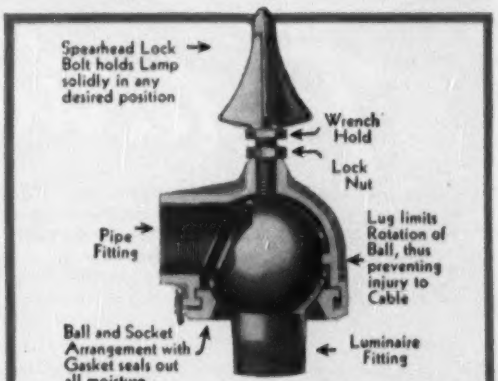
For More Data, Fill In Postcard on Page 35

the ADJUSTABLE END FITTING for PIPE ARMS

The Hubbard LEVELITE has been designed to provide a much needed flexibility on street lighting installations. Luminaires may be leveled or purposely tilted in any direction, and permanently locked in that position. Many problems in lighting can be solved by this fixture. Poles which are set some distance in from the curb might require a tilt away from the pole to throw more illumination to the roadway. Special conditions such as building obstructions, landscaping, consisting of trees which it is preferred not to trim, and instances where unforeseen changes occur after lines are in service can usually be handled in a practical manner by LEVELITE flexibility.

Mechanical working of the Hubbard LEVELITE is explained by the illustration at the right. A ball and socket movement is used, effectively sealed by a lead gasket. Rigid setting in position is maintained by a single "spearhead" bolt and lock nut. Changes may be made easily and quickly before, during or after installation.

A most popular combination is the HUBBARD LEVELITE and the new HUBBARD UPSWEEP Street Lighting Brackets. Write for a copy of the Hubbard Linebuilder describing these Brackets if you have not already received a copy.


Spearhead Lock Bolt holds Lamp solidly in any desired position
Wrench Hold
Lock Nut
Pipe Fitting
Lug limits Rotation of Ball, thus preventing injury to Cable
Ball and Socket Arrangement with Gasket seals out all moisture
Luminaire Fitting

A MAXIMUM SWING OF 34° IS POSSIBLE IN ANY ONE DIRECTION, 17° IN ANY DIRECTION FROM THE VERTICAL, OR CENTER LINE OF THE LEVELITE.

Stock No.	For Pipe Arm Nominal Size—Inches	Luminaire Attachment Thread—Inches	Approximate Shipping Wt., Lbs., 100 Pcs.
3279	1¼	1¼ (pipe)	563
3281	2	1¼ (pipe)	900
3282	2	2 (pipe)	944

HUBBARD AND COMPANY

PITTSBURGH · CHICAGO · OAKLAND, CALIF.

BRONCO 60
WIRE AND CABLE IS
CERTIFIED
BRONCO 60 NEOPRENE CERTIFIED
We certify that the jacket of all cord or cable branded "Bronco 60 Neoprene Certified" contains not less than 60% by weight of new Neoprene.
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FOR YOUR
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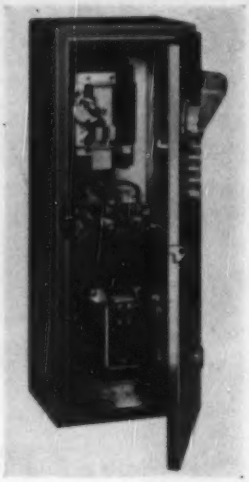
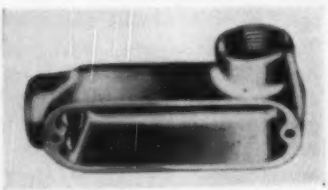
Manufactured by
WESTERN INSULATED WIRE CO.
1001 EAST 62ND ST. • LOS ANGELES 1, CALIFORNIA



Circuit Breaker Starter

(17) Square D. Co., Industrial Controller Division, 4041 N. Richards St., Milwaukee 12, Wis.

A circuit breaker type combination starter, claimed to increase operator safety and simplify installation and maintenance, is designed for control of polyphase motors, 1 to 100 hp. An interlock prevents opening door when breaker is on, although an authorized person can release the interlock for inspection without power interruption. When the door is reclosed, a self-aligning handle indicates true position of breaker. The operating handle can be locked on or off with padlocks of varying sizes. The thermal-magnetic circuit breaker is non-tamperable; gives repeat protection; can be reset by anyone. Additional data in manufacturer's Bulletin 8539.



Aluminum Alloy Fitting

(18) Killark Electric Mfg. Co., Vandeventer and Easton Ave., St. Louis 13, Mo.

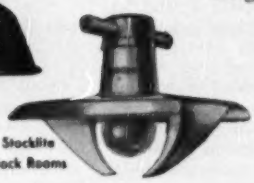
A new fitting of aluminum alloy is die-cast under 10,000 lb. pressure; weighs less than 40% as much as iron; is said to be exceptionally tough and durable, to have maximum tensile strength and malleability. Comes in a complete line for all electrical installation requirements.

Industrialite High Mounting Fixture

GOOD LIGHT...

Industry's Most Essential Production Tool!

Standard Dome Reflector



The Stocklite for Stock Rooms

● When you plan industrial lighting with Appleton Equipment the result is a finely coordinated system that paves the way for top worker efficiency, better production. That's because Appleton fixtures are scientifically designed to provide the *right light*, without uncomfortable glare, troublesome contrast or shadow. Products of nearly half a century of experience, expert engineering and unequalled manufacturing facilities, Appleton Fixtures provide maximum illuminating efficiency at minimum installation, service and operating expense. Appleton Lighting Fixtures are available in the exact type and size for every industrial requirement—including hazardous locations—whether indoors or out. Appleton's skilled illuminating engineers are ready to help you solve your specific lighting problems. For the finest in lighting equipment, specify Appleton—Standard for Better Lighting.

APPLETON LIGHTING EQUIPMENT

The EFU—First and Still Finest Explosion-Proof Lighting Fixture

Standlite — for Filling Stations, Parking Areas

SOLD THROUGH ELECTRICAL WHOLESALERS

APPLETON ELECTRIC COMPANY

1709 WELLINGTON AVENUE • CHICAGO 13, ILLINOIS

LOS ANGELES 12, 100 N. Santa Fe Ave. SEATTLE 9, 115 Ray Street

SAN FRANCISCO 1, 655 Minna Street DENVER 2, 1921 Blake Street

APPLETON

CONDUIT FITTINGS • LIGHTING EQUIPMENT • OUTLET AND SWITCH BOXES • EXPLOSION-PROOF FITTINGS • REELITES

Rely on Quality—

PYLE-NATIONAL INDUSTRIAL LIGHTING FIXTURES

for safety

IN HAZARDOUS LOCATIONS

EXPLOSION PROOF

Pyle-National LE Series: Class I, C and D

For use in locations where highly flammable materials are manufactured or handled.

Rugged, flame-tight cast aluminum alloy housings render internal explosions harmless, and insure safe operating temperatures. Threaded construction permits easy access to interior for wiring and lamp replacement. Available in many types and sizes.

DUST-TIGHT

Pyle-National DE Series: Class II, Groups, E, F and G

For use in locations where flammable dusts are present in quantity.

Strong, one-piece cast aluminum alloy housings are designed to exclude dust from the interior and to avoid accumulation of dust on the exterior surface. Available in many types and sizes.

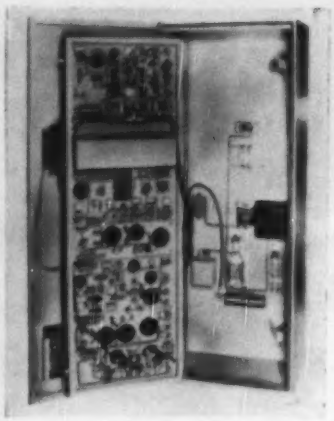
Consult the new PYLET Catalog for complete line of explosion-proof supporting PYLETS for lighting fixture mounting.

THE PYLE-NATIONAL COMPANY

1364 N. KOSTNER AVENUE CHICAGO 51, ILLINOIS

Pacific Coast Sales Office

25 Beale Street, San Francisco 4, Calif.



Carrier Current Equipment

(19) Control Corp., 718 Central Ave., Minneapolis 14, Minn.

A 25-watt transmitter for use over transmission lines having a total loss up to 55 decibels is available for single or multiple frequency operation and can be used for supervisory control, telemetering and communication. Automatic modulation control utilizing a conventional compression circuit prevents modulation in excess of 100%.

The manufacturer claims that design has limited frequency distortion in voice transmission to the extent that there is less than 10 decibels variation of receiver output level between 300 and 3,000 cycles. The receiver automatic volume control will hold the audio frequency output constant within plus or minus 2 decibels with a 50-decibel change in the carrier frequency input.

The new units are suitable for connection to a PBX switchboard or extension telephone. Equipment is adjustable by autotransformers for operation at line voltages from 100 to 130 volts, at 60 cycles, with line voltage surges of plus or minus 15%. The transmitter, modulator and receiver are switched and fused separately and also as a unit with master switch and fuse pair.

F Sun Lamp

(20) Leader Electric Co., 800 One Hundredth Ave., Oakland 3, Calif.

This portable fluorescent sun lamp produces ultraviolet radiations in the 2,800-3,200 Angstrom band. Undesirable wave lengths are blocked out to keep the lamp cool to touch, the manufacturer states. Lamp may be mounted flush to walls, ceiling suspended, or may be placed on a stand with choice of three position angles.

Pilot Light

(21) Pass & Seymour, Inc., Solvay Station, Syracuse 9, N. Y.

This flush neon pilot light added to the Despard line is said to have long life, gives off no heat; may be applied to all types of pilot light uses.

Shallow-Troffer F Unit

(22) Westinghouse Electric Corp., Box 2099, Pittsburgh 30, Pa.

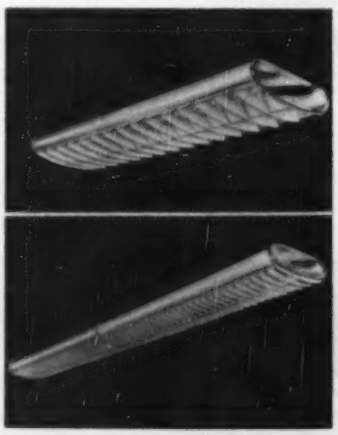
A new type TS shallow-troffer fluorescent luminaire with incandescent spotlighting requires only 7¾ in. above finished ceiling. It is installed by attaching housing to U bracket supports.

Three types of shielding are available: louver, plain ribbed glass and prismatic lens. All hinge to the basic housing and are interchangeable.

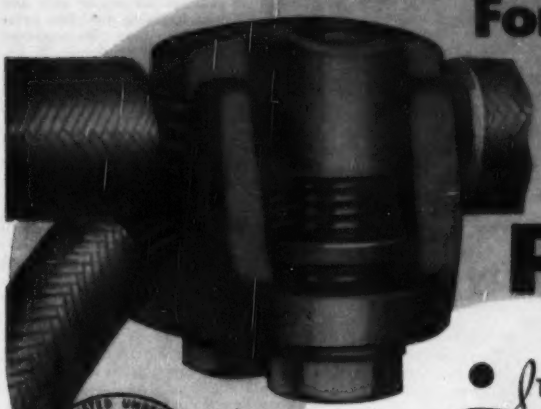
Basic housings come in 4-ft. lengths, both 2- and 3-lamp models. A 2-lamp, 8-ft. unit accommodates the 96-in. T-12 lamp operated at 425 ma.

Type SR-150 companion swiveling incandescent spotlight unit is designed for use as an individual recessed unit, or within rows or groups of TS toffers. It uses a 150-watt, PAR projector lamp; is shielded by a concentric ring louver.

(23) Two of the new Trimline series of 13 matching commercial-type louvered fluorescent fixtures announced by Sylvania Electric Products Inc., 500 Fifth Ave., New York, N.Y. They illustrate the standard-start 4-lamp style with 25° lengthwise shielding (top) and the 8-ft. 2-lamp instant-start type with 45° lengthwise shielding (bottom). May be mounted individually or in continuous rows flush or suspended



For *Heavy Duty Connections* use the PENN-TAP

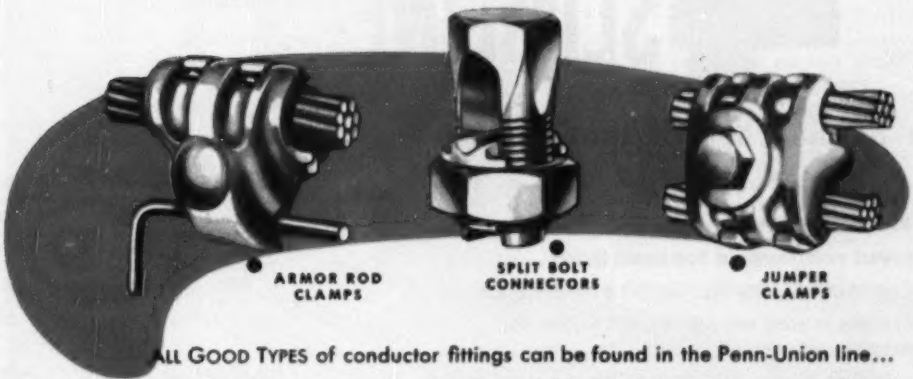


LISTED UNDER RE-EXAMINATION SERVICE UL OF UNDERWRITERS' LABORATORIES, INC.

● IT'S more sturdily constructed . . . exceptionally tough silicon bronze alloy and more of it, giving extra strength at no added cost.

For taps, service entrance connections, dead ends . . . indoor or out. Quickly installed with ordinary wrench. Recessed bolts for easy taping.

ONE PIECE—no loose parts . . . swivels on one locked bolt. Holds tight permanently. 7 sizes, for cables 10 Str. to 1,000 MCM.



ARMOR ROD CLAMPS

SPLIT BOLT CONNECTORS

JUMPER CLAMPS

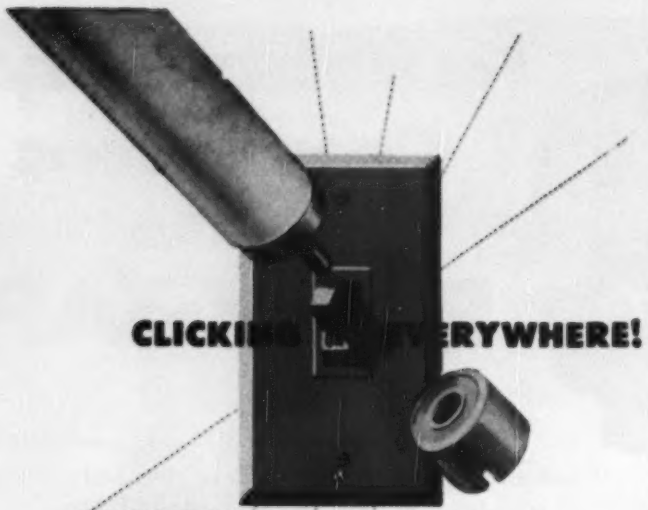
ALL GOOD TYPES of conductor fittings can be found in the Penn-Union line... thousands of items, and every one dependable. Experienced users have found that "Penn-Union" on a fitting is *their best guarantee of unfailing service.*

Kenneth Anderson Co.	Northwestern Agencies	F. M. Nicholas Co.
412 Seaton St.	4130 First Ave. South	1123 Harrison St.
Los Angeles	Seattle, Washington	San Francisco

PENN-UNION ELECTRIC CORPORATION, ERIE, PA.

The *Complete* LINE of CONDUCTOR FITTINGS

PENN-UNION



CLICKI[illegible]VERYWHERE!

GUTH 4 foot SLIMLINE

+ light-at-the-click-of-the-switch!

+ No waiting
+ No starters or starter troubles
+ Lowest maintenance in fluorescent history
+ Easy-to-handle—one man can get it through a door
+ Available in every two and four 40W fluorescent fixture in the entire GUTH line!

FOR FULL DETAILS, CALL YOUR NEAREST GUTH RESIDENT ENGINEER OR WRITE:

302

LIGHTING

THE EDWIN F. GUTH COMPANY / ST. LOUIS 3, MISSOURI

Leaders in Lighting Since 1902

(24) INSULATION TESTER — An insulation tester to aid development and control of insulation coatings for copper wire and other applications involving dielectric stress studies is available from Westinghouse Electric Corp., Box 2099, Pittsburgh 30, Pa. It consists primarily of a high-voltage transformer, a motor-driven autotransformer, and indicating voltmeter and mercury cups or terminals for connecting the specimen. Two models are available: one rated at 35 kv., 5 kva.; the other at 12 kv., 0.5 kva. Cabinet dimensions are 20x16x35 in.; weight is approximately 300 lb.

(25) CROSS SECTION PAPER—Cross section ruling on these sheets will not reproduce; only the drawing prints. May be used for blueprint, black and white or Oualid reproductions. Made by the Ogilvie Press, 961 Fulton St., Brooklyn 17, N. Y.

(26) ONE TIME FUSES—A complete series of powder-packed fuses in 250 and 600 volts and from 3 to 600 amp. have been added to the Ware line. Ware fuses now come in Hi-Lag renewable; WB renewable; non-renewable and true contact Trolley Tap. Ware Fuse Corp., 4412 W. Lake St., Chicago 24, Ill.

(27) COPPER CONTACTS REFACED—A new service renews burned or worn copper contacts by brazing on faces of silver or silver alloy. Superior Carbon Products Inc., 9115 George Ave., Cleveland, Ohio.

(28) RECTANGULAR WIREWAY—Addition of a 4x6 wireway in rectangular shape is announced by Keystone Mfg. Co., 23328 Sherwood Ave., Center Line, Mich. Comes in 1-, 2-, 3-, 4- and 5-ft. lengths. Underwriters' approved.

(29) SWITCH GUARANTEE — Free replacement is offered in case of failure of the No. 41 Levolier switch, when used in lighting circuits. It is a compact, lever action switch T rated at 6 amp., 125 volts; may be used in 3 amp., 250 volt circuits. McGill Mfg. Co. Inc., Valparaiso, Ind.

(30) LUMINOUS FLUORESCENT — The Guthglow has Polystyrene plastic or Albalite glass side panels. Translucent side panels direct part of light upward and outward; low brightness Alzak aluminum baffles shield lamp from direct view from below. Available for 40-watt lamps and for 4- and 8-ft. slimline single-pin lamps from the Edwin F. Guth Co., 2615 Washington Ave., St. Louis 3, Mo.

(31) RECORDER—A new air-operated strip chart recorder measures temperature, speed, flow, pressure, static grain loads, a-c and/or d-c; amperes, etc. Known as Pneumatic Capacilog; available from Wheelco Instruments Co., 847 W. Harrison St., Chicago 7, Ill.

(32) LUBRICANTS—A new series of diesel and heavy-duty gasoline engine lubricants has been introduced by Standard Oil Co. of California, 225 Bush St., San Francisco 20, Calif.

(33) TUBING — Commercial production of polyethylene film, sheeting and seamless flat tubing has been announced by the Fibron division of Irvington Varnish & Insulator Co., Irvington 11, N. J. Identified by the trade mark "Ivithene," these extrusions are now available in a greater range of widths and thicknesses than previously obtainable.

MORE POWER THROUGH WIRES BY U. S. RUBBER

SMALLER DIAMETER CONTROL CABLES INSULATED WITH Laytex*

NO OTHER CONTROL CABLE HAS Laytex INSULATION

Great news for the power industry! U. S. Rubber Control Cables present unique advantages—thanks to Laytex (90% pure rubber) insulation.

First, Laytex insulation means fully insulated conductors of smaller diameter resulting in smaller diameter cables—this permits *more cables in a given space*. By U. S. Rubber's dip process, the conductors are perfectly centered in the insulation, eliminating any chance of thin spots.

Next, Laytex provides a more efficient and trustworthy insulation, unexcelled in electrical qualities. Dielectric and tensile strengths are extremely high.

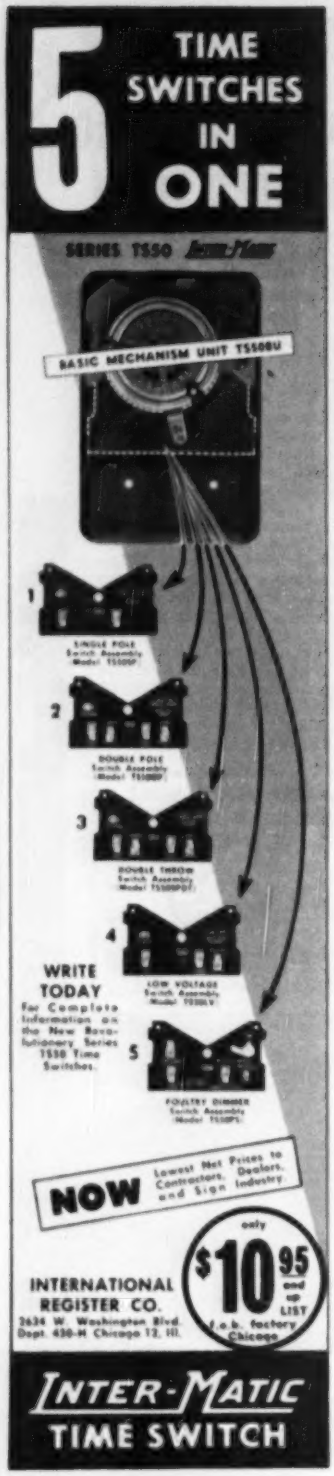
Laytex also has very low water absorption, and high aging and moisture-resistant properties.

The vast network of Control Cables is of tremendous importance in any power system. You can't afford not to use the best. Name your operating conditions—you'll find that no cable does a better job than "U. S."—because *no other cable has Laytex insulation*.

Send today for a sample plus booklet containing more details about this new wire. Write Wire and Cable Department, United States Rubber Company, 1230 Avenue of the Americas, New York 20, N. Y.

*Reg. U. S. Pat. Off.

SMALLER DIAMETER MEANS MORE CABLES IN A GIVEN SPACE
U. S. Control Cable (7 conductor) insulated with Laytex
Ordinary 7-conductor Control Cable
U.S.
U.S.RUBBER
SERVING THROUGH SCIENCE



BULLETINS ETC.

(34) BREAKERS—Moderate-capacity oil circuit breakers of quick-clearing, non-oil-throwing design, for outdoor distribution service where reliable, safe operation is required without frequent adjustment, are described in bulletin 71B6093C from Allis-Chalmers Mfg. Co., 942 S. 70th St., Milwaukee, Wis. Designated types OZ-110 and 210, they have rated voltage of 23.0 kv. or less up to 250,000 kva. interrupting capacity.

(35) PARTS EXCHANGE — A directory of 146 field service shops and price list for welder exchange parts is available from Lincoln Electric Co., Cleveland 1, Ohio.

(36) PANELBOARD BREAKERS—A folder on non-thermal, fully magnetic panelboard circuit breakers is available from Heinemann Electric Co., 712 Plum St., Trenton 4, N. J.

(37) TAPE—Permacel electrical tapes are described in a folder from Insulation Mfgrs. Corp., 565 W. Washington Blvd., Chicago 6, Ill.

(38) TRANSFORMERS—Pole Star transformers in 37½- to 100-kva. sizes, embodying a new wound core design, with inherent low exciting current, are described in a bulletin from Pennsylvania Transformer Co., Canonsburg, Pa.

(39) DEAD END—a new service-drop automatic dead end for use with preassembled messenger-supported cable and a new service-drop anchor bracket that permits insertion of a closed bail or loop without opening, are described by Electroline Co., 4121 S. LaSalle St., Chicago 9, Ill., in a recent data sheet.

(40) SECTIONALIZERS — A 2-page bulletin from Electroline Co., 4121 S. LaSalle St., Chicago 9, Ill., tells about a new line of automatic insulating line splice sectionalizers.

(41) CONTROL EQUIPMENT—Data on its line is given in a new 16-page bulletin from Federal Electric Products Co., 50 Paris St., Newark 5, N. J.

(42) HEATING — Electric heating units for industrial, commercial and domestic use are described in a bulletin published by Thermal Inc., 3440 W. Lake St., Chicago 24, Ill.

(43) PLASTIC—A revised Micarta Data Book is available from Westinghouse Electric Corp., Box 2099, Pittsburgh 30, Pa. Grades and forms are tabulated, with chemical, mechanical and electrical properties of each. Standard shapes and sizes are listed; finishes described.

(44) SAFETY—The 1950 issue of "Everything in Safety," a catalog of personal protective equipment and industrial safety devices, is available from General Scientific Equipment Co., 2700 W. Huntington St., Philadelphia 32, Pa.

(45) MOTORS—An 8-page, 2-color bulletin on low-speed synchronous motors is offered by General Electric Co., Schenectady 5, N. Y. It is designated GEA-5332.

(46) ELECTRIC STAIRS—Booklet B-4403 from Westinghouse Elevator Division, Jersey City, N. J., gives The Who, What and How of that company's electric stairways.

(47) CONTROLLERS — Automatic time-temperature program controllers are treated in a data sheet released by Wheelco Instruments Co., 847 W. Harrison St., Chicago 7, Ill. Known as Chronotrols, these instruments are used in the industrial processing of metals, chemicals, ceramics, etc., where application requires a predetermined heating and cooling cycle.

(48) LIGHTING—Planned lighting for modern banks and offices is the subject of a recent publication by Pittsburgh Reflector Co., 406 Oliver Bldg., Pittsburgh 22, Pa.

(49) SPLICING — Unit splicing kits for all types of cables are listed in bulletin J50 from G&W Electric Specialty Co., 7780 Dante Ave., Chicago 9, Ill.

(50) HISTORY—Another recent bulletin from G&W Electric Specialty Co., 7780 Dante Ave., Chicago 19, Ill., gives general information.

(51) WIRED TV — The "Utiliscope," wired television, claimed to let you see where you can't look, is described in a bulletin from Diamond Power Specialty Corp., Lancaster, Ohio.

(52) TRANSFORMERS—Data on Niagara oil-immersed, self-cooled transformers is given in a new publication of Erie Electric Co., 120 Church St., Buffalo, N. Y.

(53) TRANSFORMERS—Improved Amer-Tran air-cooled transformers are described and illustrated in publication 110-02 of American Transformer Co., 285 Emmet St., Newark 5, N. J.

(54) OPERATIONS—Marking its 50th anniversary, Trumbull Electric Mfg. Co., Plainville, Conn., has prepared a six-page brochure for its distributors, containing new products and developments and changes in the marketing organization.

Fill in the postcards on page 35

To get more information on new products and to order catalogs or bulletins mentioned in this section, fill in and mail the bottom postcard on page 35. Electrical West Reader Service is being expanded to include information on any department in the magazine. Use the second card on page 35 to ask questions or make suggestions.

. . . with MOLONEY indoor load center type UNIT SUBSTATIONS!

You *eliminate* fire hazard when you use Moloney Indoor Load Center Type Unit Substations with Askarel or Dry Type Transformers because . . .

- Askarel Transformers contain a non-inflammable cooling and insulating medium
- Dry Type Transformers contain Class B insulating materials and are Natural Draft Air Cooled
- All live parts are totally enclosed

PLUS THESE EXTRA SAFETY FEATURES

- Interlocks prevent operation of primary switch without first tripping the secondary breakers
- Primary fuse compartment cannot be opened unless primary switch is in "open" position

PLUS THESE OPERATING ADVANTAGES

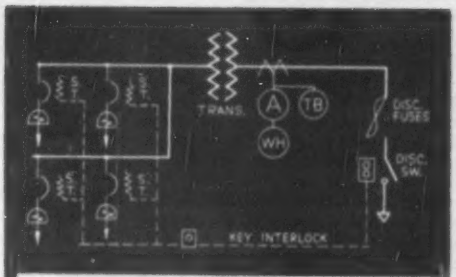
Greater Economy . . . No expensive long runs of heavy secondary copper when substation is placed indoors at center of load!

Better Voltage Regulation . . . resulting from shorter runs permitting more efficient use of power.

Greater Convenience . . . Delivered complete in one unit . . . or in sections. Permits access to various parts . . . ease of inspection and maintenance.

Moloney Load Center Type Unit Substations with Dry Type or Askarel Transformers are being used in Power Generating Stations for Station Service, in Industrial Plants and Office Buildings.

ME49-51



Moloney Load Center Type Unit Substation consisting of three sections: Primary Incoming Line Section . . . 5Kv Askarel-filled disconnect switch, primary power fuses, voltmeter and watthour meter with current and potential transformers; Transformer Section . . . 300 Kva, 3-phase 60 cycle, Moloney Askarel cooled transformer, 4160Y to 480 volts; Secondary Switch Gear Section . . . Four feeder Air Circuit Breakers of 25,000 amperes interrupting capacity.

MOLONEY ELECTRIC COMPANY

Sales offices in all principal cities

FACTORIES AT ST. LOUIS 20, MO., AND TORONTO, ONTARIO, CANADA

ELECTRA'S HUSBAND

"WHAT does it mean when it says here that Secretary of State Acheson wants to scare the britches off the American people?" Electra said one evening as she looked up from the paper.

"Mr. Acheson seems to think that we aren't sufficiently afraid of communism," I answered. "So in his two speeches in San Francisco he started a campaign to awaken the public to Big Joe's ultimate aims on the U. S. This whole cold war is a propaganda fight and up to now we have been on the losing end. Or so Mr. Acheson thinks. Hence the scare treatment."

"Frankly I have been plenty scared," Electra commented, "especially that some foggy Tuesday morning this whole area might be sprayed with A-bombs from Russian submarines outside the Golden Gate. But I've felt relieved ever since Henry Grant told us that Dr. Ernest O. Lawrence has moved out in the Walnut Creek area. Now if he had moved his family as far away as Winnemucca, Nev., I really would have been frightened."

"That's the way Big Joe would like to have you feel," I mused. "Fear and confusion are the two major propaganda tools he is using in his endeavor to take us over without ever detonating the fuse on one tiny bomb. As a matter of fact, fear and confusion are the principal weapons of the militant propagandist irrespective of his cause or his mission."

"Is that what you try to do to me in a Canasta game?" she jibbed. "You certainly aim to confuse, even if you can't scare me. Some day you'll get me so mad I'll quit playing."

"No, it's card sense and luck in Canasta," I said. "The propagandist is the fear and confusion artist. That's one of the subtle approaches that the bureaucrats use in their campaign to socialize the electrical industry. Confuse the issue and plant the seeds of fear on any fertile ground. Compound the confusion and then walk in for the take over. I've just been reading about a situation where those tactics are going to pay off. Big Joe himself could not have done a better propaganda job. Let me quote some of the things said by a man who is resolved to lose his business. You know him so I'm going to disguise his identity as best I can. You wouldn't want to label him a defeatist."

So I read to Electra the following paragraphs from the annual report of one of our Western utilities, disguised to the extent of omitting all names:

"It is no exaggeration to say that the atmosphere surrounding the company is that of a 'maze of political uncertainty.' We are being 'victimized by guerrilla warfare' and do not know from one day to the next what the various public agencies are up to as regards putting us out of business. The federal government, the state, the PUDs and certain cities are in, or are trying to get into, the 'act' and some of these government agencies do not care how they do it or how grave the consequences of their actions are to our employees, our customers and our stockholders. These intensely ambitious public agencies are each guarding their prerogatives and jockeying for top position in the conquest, the next effect of which is to 'handcuff and jam' us in the revolving door of public power rivalry and aggression. Such conflicts or interest and 'wheels within wheels' among the public power agencies and other destructive influences are obstructing and preventing the solution of the critical power problem in our service area . . . . .

"Over the years we have been sold down the river because of the apathy of many people and the succumbing of others to the 'almighty dollar lure' of public power while giving eloquent lip service to free enterprise. A private utility cannot stay in business, as some seem to think, just because such is the wish of management. A utility can stay in business only if the people make it possible for it to do so. It is the people who make the decision as to whether a private utility lives or dies. It should be realized that the people cannot give public agencies all sorts of tax subsidies, special privileges and cheap money advantages and at the same time expect private power competitively to coexist with public power, especially in these days when labor and material costs and taxes are all extremely high and the interest rates for tax-exempt bonds are low. These tax subsidies and special privileges given to public power agencies are used as tools for the oppression and subsequent elimination of private enterprise . . . . . ."

I stopped reading and said to her.

"See what I mean by a propaganda job? Fear and confusion compounded."

"No, you're not quite right," she interrupted. "You mean realities."

SUBTLE APPROACH TO SOCIALIZATION

"I THOUGHT most appliance stores used their service departments to build customer good will and to create more sales," Electra said recently.

"They do. What's the pitch?"

"Well Mason's have lost a good customer," she explained. "The Palmers."

"What happened?" I asked.

"Well the Palmer's new radio-phonograph started squeaking and grinding whenever it played records," she recited. "So Mrs. Palmer called Masons and asked them to have someone look at it. Three or four days later two service men drove up and looked the set over. They said all that was needed was a couple of drops of oil on the phonograph turntable. So they oiled it and left. Then Palmers got a bill for $7. Mr. P. thought it was just a bit steep so he protested. He was told that $7 was a reasonable charge, that the men had to be paid for travel time, and that, even though the service was simple, the men are entitled to something for their knowledge and skill.

"Mr. P. didn't think much of that answer and told Masons so. They informed him that he didn't have to use their service department, and he said that he wished that he hadn't and that he wouldn't ever again. But that wasn't what really burned him."

"So I would assume," I commented.

"What really griped him was that the service men didn't have an oil can. They had to borrow one from Mrs. Palmer."

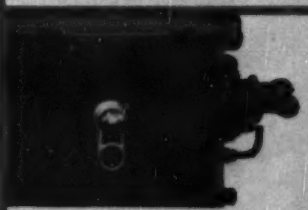
THESE *ACP** FEATURES MEAN SAVINGS TO YOU!

1 LOW VOLTAGE BREAKER, internally mounted, protects against all secondary overloads and short circuits.

2 LIGHTNING ARRESTERS, either expulsion or valve type, assure complete high voltage surge protection.

3 CHUCK TYPE CONNECTORS eliminate all exposed live parts. To make connection, simply insert lead, rotate housing.

4 TANK DISCHARGE GAP provides path for surges on units where ungrounded tank practice is used.



5 LOW VOLTAGE NEUTRAL GAP provides surge protection for LV winding. Can easily be replaced with ground strap.

6 SIGNAL LIGHT, HOOKSTICK RESET and emergency service restoration lever are mounted in one compact assembly.

Simplified Installation . . . Fewer Outages . . . Visual Load Checks Mean Money Saved on ACP Transformers with Premium Protection

ACP TRANSFORMERS PAY THEIR OWN WAY from the moment installation starts. They're economical to install because transformer and protective components are completely packaged in one easy-to-install unit. No assembling or adjusting in the field.

FEWER OUTAGES, INCREASED CAPACITY

Once they're up, ACP transformers stay on the line longer than conventional units. Secondary breaker, actuated by oil temperature or excess current, is closely coordinated with thermal characteristics of the transformer it protects. Result: short time overload transformer capacity is fully utilized . . . the number of outages reduced.

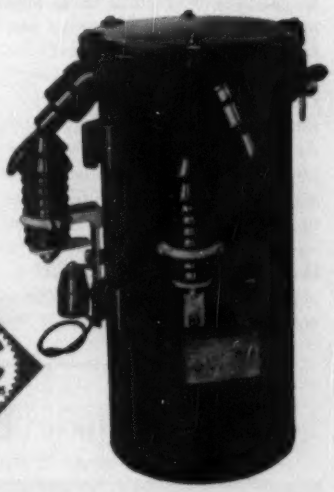
KEEP TAB ON SYSTEM LOADING

You also eliminate expensive load checks requiring time and special equipment. On ACP transformers 5 kva and up, signal light does the job for you — provides simple, continuous check.

Want more details? NEW ACP transformer bulletin 61B7309A is off the press! Call your nearby A-C district office for your copy.

A-3004

ALLIS-CHALMERS, 939A SO. 70 ST.
MILWAUKEE, WIS.



*ACP (Allis-Chalmers Protected) is an Allis-Chalmers trademark.

ALLIS-CHALMERS

It's EASY to install "Payroll Savings"

If you've put off installing the Payroll Savings Plan in your company because you feel it would be "a lot of work," then this advertisement is certainly for you! Because it's really very simple to give your employees the advantages of investing in U. S. Savings Bonds the easy, automatic "Payroll" way.

. . . and 20,000 companies' experience proves it pays!

HERE'S ALL YOU NEED TO DO

Appoint one of your top executives as Savings Bond Officer. Tell him to get in touch with your State Director, Savings Bonds Division, U. S. Treasury Department. Here's what happens . . .

The State Director will provide application cards for your employees to sign—plus as much promotional material and personal help as necessary to get the Plan rolling in your company.

Those employees who want Savings Bonds indicate on the applications: how much to save from their pay; what denomination of Bonds they want; and the inscription information to appear on the Bonds.

Your payroll department arranges to withhold the specified amounts, arranges to get the Bonds, and delivers them to the employees with their pay.

The Bonds may be obtained from almost any local bank or from the Federal Reserve Bank or may be issued by the company itself upon proper certification by the Federal Reserve Bank or Branch in the company's District.

THAT'S ALL THERE IS TO IT!

In case you're skeptical as to how many of your employees would like to have Payroll Savings, canvass your plant—and be prepared for a surprise. (Remember that pay-check withholdings for Bonds are *not* a "deduction"—the employee takes home his Bonds with his pay.) One leading manufacturer, who had professed little faith in the Plan, found his eyes opened when he asked the people in his plant whether they would like to obtain Bonds in this way. Within only six months after he installed the Plan, half his employees signed up. A prominent aircraft manufacturer, whose company had used the Plan for some time, was not aware of its potentialities until his personal sponsorship increased participation by 500% among his company's employees.

THE BENEFITS ARE BIG—FOR EVERYONE

The individual employees gain security—they know that the Bonds they hold will return $4 for every $3 at maturity. The company gains from the resultant increased stability and efficiency of its workers. The whole nation gains because Bond sales help stabilize our economy by spreading the national debt and by creating a huge backlog of purchasing power to boost business in the years ahead.

Is it *good policy* to deprive your company of Payroll Savings—even one more pay day? Better at least have a talk with your U. S. Savings Bonds State Director, get the answers to your questions, and *know for sure.*

The Treasury Department acknowledges with appreciation the publication of this message by

ELECTRICAL WEST

This is an official U. S. Treasury advertisement prepared under the auspices of the Treasury Department and The Advertising Council.

NEW! COMPACT! ECONOMICAL!

Murray LOAD CENTERS

with Fully Magnetic Circuit Breakers that are Interchangeable with Other New Single Pole Individually Housed Breakers

Now you can get all the advantages of fully magnetic circuit breaker protection in load centers that are trim and compact — with breakers that are interchangeable with other new single pole individually housed breakers! Now you can get utmost flexibility with minimum stock — make up your own combination right on the job! Now you can forget about "derating" . . . now you can banish the nuisance of false tripping . . . now you can make satisfactory installations of circuit breakers in warm or poorly ventilated locations—where space and cost are important!

These compact new Murray load centers are available in 2, 6 or 8 circuit models. They come equipped with the sensational new small size Murray fully magnetic circuit breakers — new 30 per cent smaller than previous fully magnetic circuit breakers — available in ratings of 10 through 50 amp. They save you time . . . save you trouble . . . save you money — yet assure the user positive protection combined with utmost satisfaction!

Shallower Box—

—only 3 inches deep—ideal for flush installation in "dry wall" construction. Plus a simple ½" plaster line adjustment!

See for yourself why Murray fully magnetic breakers can't trip from heat . . . never need derating . . . always carry rated load plus harmless overloads—even in warm locations and poorly ventilated panels. Clear, simple diagrams tell the story in this folder. Write for your copy today.

Murray MANUFACTURING CORPORATION

1250 ATLANTIC AVENUE • BROOKLYN 16, N. Y.

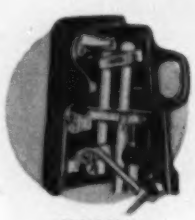
Electrical Safety Devices for Home and Industry

INDICATING

By Simply Changing Doors...

Four Cutouts in one!

DROP-OUT



RECLOSING

DISCONNECT

These General Electric enclosed fuse cutouts simplify your stocks. With *three interchangeable doors*, which fit both 5-kv and 7.5-kv housings, you get four operating functions—indicating, drop-out, two-element reclosing, and disconnect.

This is flexibility that spells real economy. By stocking only two housings and three doors, you can fill *all* your 50-ampere primary fuse-cutout requirements for circuits up to 12.5 kv Gr-Y—including a disconnect good for 100 amperes. The same flexibility is also available in 100-ampere cutouts, providing a 200-ampere disconnect.

When you need visual indication of a blown fuse, these are the cutouts to use. They are liberally designed—have permanently high dielectric strength, provide full-range interruption of fault currents and are conservatively rated as to interrupting capacity. All live parts are completely enclosed for maximum safety. For complete information, see your nearest G-E Representative, or write for Bulletin GEA-3448. *Apparatus Department, General Electric Company, Schenectady 5, N. Y.*

GENERAL ELECTRIC

Primary Fuse Cutouts for all Service Requirements

Non-indicating enclosed fuse cutout

Open-type cutout with drop-out fuse holder

Flip-open fuse cutout for rural lines

Oil fuse cutout for high interrupting capacity

With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.

APRIL, 1950 Vol. 104, No. 4

ELECTRICAL WEST

SPOKESMAN FOR THE MOST HIGHLY ELECTRIFIED SECTION OF THE U. S.

THE NEXT FIFTY YEARS

GEORGE C. TENNEY
Editor
Electrical West

AMERICA today is at the midpoint of the 20th century. We have just closed the most amazing fifty years in the history of any nation, in which this country made greater economic progress than any other country since the beginning of civilization. We are about to embark on what, to my belief, is the most pregnant half century in our or any other history. In the next fifty years we will determine whether or not America can continue to survive as a nation of free people. Of even greater import, we will determine whether or not the peoples of the world can survive in an era of scientific development in which our scientists have now armed us with a weapon which threatens to destroy us.

Obviously, a lot of us won't live until the year 2,000; a few might, but it's a certainty that unless we settle our differences in the international field, none of us is likely to survive a fraction of the next fifty years. I'm mindful of a story which was told recently by one of the foremost newspaper editors in the country. He said that there was a sleeping boy who was awakened in the middle of the night by the striking of a clock. He counted the strokes—"one, two, three, four, five, six, seven, eight, nine, ten, eleven, twelve, thirteen, fourteen, fifteen, sixteen." The youngster didn't know that the striking mechanism was broken. So he jumped out of his bed and ran down the hall, calling to his mother and father and to his brothers and sisters, "Wake up, wake up! It's later than it's ever been before!"

Yes, it's later than it's ever been before, and there are pessimists who are likely to say that it's too late: Too late to stem the rising tide of state socialism which threatens to engulf the American people in the confusion of a welfare state. Too late, perhaps, to build world understanding and fellowship that will outlaw atomic warfare.

Frankly, I'm not willing to subscribe to the pessimists' belief that it's too late. It isn't too late so long as there are informed and articulate people who know and can tell what sparked America's great progress in the last fifty years, and how we can continue to have more goods for more people with more time and more money to enjoy them. But each of us must be articulate and each of us must be informed if we are going to tell the story of what made America great and save this country. Each of us should be able to tell that story in our dinner table conversation, over the bridge table, to our associates in our business organizations, to the minister of our church, to the members of our lodge and, yes, even to our wives, because it's my feeling that women will determine very largely in the way they cast their ballots in the next couple of elections whether this country goes to the left or to the right.

There are too few people who know and too few people who realize what makes America tick, and that's why, in my opinion, it's possible for so many people to be misled today by high-sounding schemes and by a tax upon our economic system. No, it isn't too late to tell how the American system can bring about a new era of hope and plenty for our people in a climate of freedom, competition and opportunity.

There's one good way to tell the story and that's to show the progress which has taken place in the last fifty years: by comparing 1900 and 1950 in terms of jobs, of wages, of quality and quantity of products, of working and living conditions, and to point out some of the promises that might lie ahead. In this story-telling the electrical industry has a great opportunity, because in the last fifty years it's grown actually from bare infancy to its present great stature. And in that growth it has provided more human comfort and more productivity than any other industry in America, measured by any standard —national, regional, or local. It's an amazing story of promise and of progress.

If we think back to the year 1900 we remember that all of the elements for this present-day development as we know it were present.

If we go back to the year 1900 and examine the history of the electrical industry in this region, we will find that high-voltage transmission as we know it today had been perfected here in the West. The first lines were then operating at 30 kv. and 70-kv. lines were being planned. Competition was extremely keen—there were eight utility companies serving the city of San Francisco in 1900. Where industry had any political problems, they were largely of a local character and they dealt with obtaining franchises.

Strangely enough, industry organization as we know it today had been initiated by then. The Pacific Coast Electrical Transmission Assn. was a year and a half old in 1900; it had twenty-four members, reaching from Seattle down to Portland over to Salt Lake to Sacramento, San Francisco, Fresno, Santa Monica, Los Angeles and San Diego.

In the intervening fifty years from 1900 up to date, the same attractions we know today — favorable climate, natural resources, the Western way of life—attracted millions and millions of people to this Western empire. We know that people make markets and markets attract industry. And in the constant enlargement of the economic base of the Western states the electrical industry played an extremely important role. Fortunately, the West had an abundance of low-cost electric power and that has been one of our greatest economic assets.

Let me cite a couple of present-day gages to bear this out. Look at these mid-century milestones: The first is a generalization because it's the reduction to the least common denominator of all the statistics that apply to the electrical industry in this region. The West, with one-eighth of the country's

population, has one-sixth of the nation's generating capacity and uses one-fifth of all of the electricity consumed in this country.

Industry Milestones

Let's look at some other milestones of this industry of ours. In fifty years our industry has given the American people radio and television and all of the electric services in the home with the exception of lighting. That includes cooking, refrigeration, laundries, cleaning. In fifty years our industry has almost completely electrified the industrial machine of America. Today the supply of machine power back of the American worker is four and one-half times on the average what it was in 1900. Electricity now performs the work of one and a half billion men in the industrial plants of America. Production has doubled in terms of output per hour of work. Purchasing power of the family has doubled. The total number of jobs in this country has doubled since 1900. Today the average American home consumes two and one-half times the total amount of goods that it did in 1900.

By any measuring stick the answer is the same: In the half century just closed the United States became the richest and the most productive country in the history of civilization. And I think we can say without contradiction that the electrical industry was the principal contributor to this great achievement. Today this country with but seven per cent of the world's population and six per cent of the world's land area, produces forty per cent of all of the world's goods and services. The incomes of the 142 million Americans are greater than the total income of 600 million Europeans or one billion Asiatics. The average week's wage of a worker in this country will buy eighteen times as much bread or as much milk as will a week's wages for the average Russian worker. Yes, I think we can safely say that electric power has helped to make the United States' people the world's experts in mass production, and American initiative has made the American people the world's experts in mass marketing.

Now to the uninitiated this looks like a perfectly wonderful picture. If one were not familiar with all of the facets of the picture, he might say that certainly the future of an industry with that kind of a record is as bright as its past. Unfortunately, we live in a world of people, and we're subject to all of the human relationships in which people become involved. The great question today in so far as our country is concerned, in so far as the world is concerned, in so far as our businesses are concerned and in so far as we as individuals are concerned is how can we get along with our fellow man. Here the picture is not so good. I think all of us have to recognize that the world today is filled with suspicion and hatred. There is a great fundamental conflict between communism and democracy and it isn't clear today just which one will win out.

Human elements are the things that make predictions and projections precarious things. If we had only to base our projections on curves and statistics and trends, it would be easy, but it's extremely difficult to predict emotions and human relations.

Despite that, I think I can make a few generalizations with respect to the future. And the first of these is that today's electrical use is only a fraction of the actual potential. And to prove that, I would simply like to cite the situation in the home. The average American home uses only one-fifth as much electric energy and one-fifth the electrical devices that we today accept as industry standards. This is a real challenge and a real test to our salesmanship. Somehow or other I can't agree with some who say that there will be no new applications or no new developments in the way of electric service for the home in the next fifty years. Anyone who has been in some of our industry's research laboratories must be convinced, as am I, that these laboratories will produce equal or greater miracles within the next few years than anything in the past.

One is safe in predicting that the size of our industry as we know it today will double sometime within the next fifteen or twenty years. And I'm certain that if any of us are alive in the year 2000 that we can look back on the half century 1950 to 1999 and point to equal or greater progress than we have seen in the half century just closed.

Economic progress such as that just outlined we can take in our stride. It's the social and the political change that can destroy us if we are complacent in our attitudes. I think that each of us has an individual responsibility to tell the story of the system that made America great. Each of us must know that story—I am sure that most of us do, but we simply don't tell it. I think each of us knows that the American economic system is unique, because in good times and in bad the American way of life has provided more for our people than any other system in the history of world civilization. I think each of us knows that the American system is based upon the dignity and the freedom of the individual — morally, politically and economically. And we know that the American system has only been preserved through idealism and through great human sacrifice on the part of some of our fellow Americans. I think we know also that the system produces the greatest reward for initiative of anything that has been known in the history of the world. So I urge that for your individual contribution to the welfare of our industry in the next fifty years each of you dedicate some part of your time to the achievement of these simple goals which we in the publishing and advertising business call a Platform for All Americans.

Platform for Americans

1. We believe in the freedom of the individual to work in callings and localities of his own choice.

2. We believe in the freedom of the individual to contract about his own affairs.

3. We believe in the freedom of the individual owner of property to start and manage an enterprise, to invent and to profit, to invest and to buy and to sell in a free market, in so far as this freedom does not conflict with the public interest.

4. We believe in the freedom of the individual to speak, to inquire and to discuss.

5. We believe in the protection for the individual by private and public means against the basic hazards of existence over which he has no control.

6. We believe in government action in economic affairs only when necessary to insure national security or to undertake socially desirable projects when private interests prove inadequate to conduct them.

7. We believe in the freest possible competition consistent with the public welfare, with no uncontrolled monopolies of any kind—in business, in government, or in labor.

8. We believe in free collective bargaining—the right of labor to organize and to bargain collectively with employers.

9. We believe in an expanding productivity as a national necessity.

10. We believe in increased recognition of human values as a prerequisite to better living.

If each and every one of us believes in these things, if we are articulate in enunciating them individually and collectively, and we are willing to make sacrifices to preserve them, I can sincerely predict that we may look forward to the next fifty years with hope and with confidence.

Electric space heating demand control equipment in this seven-room Portland home shows promising results (Fig. 1)

Demand Controlled House Heating

Lindsay M. Applegate

Bonneville Power Administration, Portland

The author conducted this test privately to develop a type of electrical house heating that would be satisfactory to the home owner and acceptable to the power company from a demand point of view.

IN areas where energy is sold to residential customers at an average cost of a cent per kilowatt-hour, electric house heating is attractive to a limited but important class of customers. Electric heating is reasonably economical in small well-insulated houses. It is not a bad load for the supplying utility when the demand is properly regulated. This article describes a heating installation with demand regulation which has been satisfactory to the user and as a power company load during the winters of 1948-49 and 1949-50.

In the climate of western Oregon where this installation is located, well-insulated five-or six-room houses will need in the coldest month about 3,000 kwh. for heating and other domestic requirements. The house where this test was made is shown in Fig. 1. The dimensions are 46x37 ft., not including the garage. There are two bedrooms, living room, dining room, kitchen, bath and a large utility room. The utility room was not heated except by the heat loss from the furnace. The net heated area of the house is 1,300 sq. ft. The utility room temperature in cold weather usually runs about 10° below the rest of the house. The outside walls of the house are insulated with 3-in. glass wool batts and the ceiling with 3 in. of loose rock wool. Storm sash is used on all windows in the winter months.

The winters 1948-49 and 1949-50 were among the coldest recorded in the Pacific Northwest in half a century. The largest monthly billing so far for this house was $33.63 for 3,148 kwh. and a half-hour demand of 12 kw. for the month Jan. 11 to Feb. 9, 1950. This included all-electric service for the house. The total billing for the year Aug. 11, 1948 to Aug. 19, 1949 was $177.47. The lowest monthly bill was $5.04. The estimated annual billing for this house if no power were used for heating would be about $80. This leaves about $97 for the year's heating cost. To the time of this writing, a comparison of billings can be given for the periods Aug. 10, 1948 to Feb. 9, 1949 and Aug. 10, 1949 to Feb. 9, 1950. For the six months of the 48-49 period, 10,876 kwh. were used at a total cost of $108.40. For the corresponding six months of the 49-50 period 10,722 kwh. were used at a cost of $113.09. The demand in the earlier period went to 13 kw. but it was held to 12 kw. in the later one. An increase in the power rate became effective between the two periods. This accounts for the increase in cost per kwh. from 1.00c to 1.05c.

The half-hour demand varied from 7 kw. when no heating was used, to a maximum of 13 kw. The demand probably would have gone to about 15 kw. if the customer had paid no attention at all to demand. Limiting the demand to 13 kw. maximum was accomplished with little effort and no hardship. There was, during that year, no demand control on the house except the demand limitation inherent in the design of the heating system. This is important, since without it the demand would have been about 20 kw. It has since been found that the house can be operated satisfactorily with a half-hour demand of 11 kw. with an additional control.

It is evident that, in a month in which the energy requirement is 3,000 kwh., or 100 kwh. per day, if the energy is used during the day from say 6:00 a.m. to 10:00 p.m., the average demand of the house is between 6 and 7 kw. The average load required to keep a house like the one in this test warm in cold weather after it has been brought to operating temperature is about 6 kw. The house can be brought up to operating temperature in the morning without exceeding 10 kw. if the heating is started at a reasonable hour.

This is illustrated in Fig. 2 which is a current chart taken on the heating plant on Jan. 24, 1949. This day was much colder than the average January day in this locality. The outside temperature for the day varied from 18 to 28°. A 24-hour clock started the furnace at about 6:15 a.m. The in-

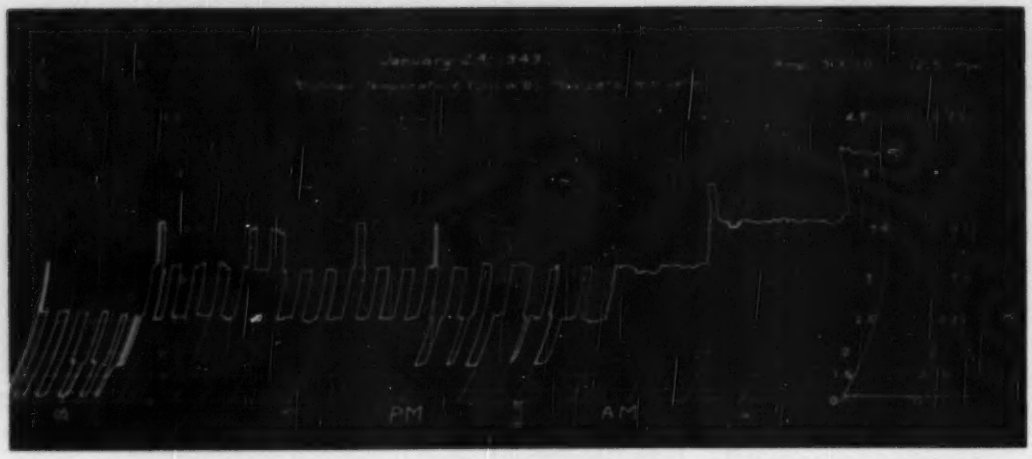


Fig. 2—Current chart showing electric furnace operation. Demand has not exceeded 10.5 kw. because of demand control

itial demand of about 10.5 kw. dropped to about 9 kw. in less than an hour, to about 8 kw. in three hours and to 6 kw. in about five hours. The load oscillated from 6 to 8 kw. until 7 p.m. when some heat from a fireplace cut the demand to an average of about 2 kw., causing the furnace to shut off entirely five times between 7 and 9 p.m.

It is obvious, of course, that this house could be heated more quickly in the morning if the demand were allowed to go higher, but it is equally obvious that if the house needs to be heated earlier, it can be done by starting sooner. This, from the power company point of view, is preferable. From the chart it is evident that, whatever the early morning demand may be, about 9 kw. is enough for most of the morning's heating. A valid conclusion is that a demand of about 2 kw. per room is sufficient.

Demand Control

The problem of regulating the demand in electric heating systems has been extensively investigated. One solution of this problem is embodied in the novel electric heating system (patents pending and allowed) used in this test. Fig. 3 shows the exterior of the electric furnace and duct work. There is a duct and heater for each of six outlets. Some of the internal structure of the furnace is shown in Fig. 4, and in more detail in Fig. 5. There is a heater and a thermally operated damper for each duct, and a central heater in the plenum chamber common to all ducts. There is a thermostat in each room and a magnetic switch in the furnace for each duct heater. The seven switches shown in Fig. 5 are SPST mercury, one of which is used to control the fan motor. Conventional open contactors are equally satisfactory. The fan, motor, and glass filter are conventional. The cold air is taken direct from the utility room, although in other similar installations cold air ducts have been used.

Each duct heater, when on without any of the others, draws 3 kw. If there were no inherent demand limitation, the furnace would take 18 kw. when all six duct heaters are on. The actual demand, however, as shown in Fig. 2, is only about 10.5 kw. When two duct heaters are on at the same time, the demand is approximately 5.5 kw. or 2.75 kw. per duct. With more duct heaters on, the demand per duct decreases further until, when all six are on, the individual allowance is about 1.75 kw. and the total demand 10.5 kw. This is accomplished without any switching other than the on and off operation of the SPST switches on the individual duct heater circuits.

This load limitation, inherent in the electrical circuit, relieves the customer of most of the control needed for reasonable economy. In the tests the setting of thermostats usually followed the routine of the household. The bathroom, living and dining rooms were heated to 70° most of the time. The other thermostats were usually set at 65° when a room was not in use. The thermostat was set up to 70° whenever additional heat was wanted. At night no special setting of thermostats was made. They were left at any settings they happened to be on at the end of the day's heating. In the morning when the house temperature had usually fallen to 55° (the lowest setting of the thermostats), all thermostats were on as indicated in Fig. 2. In the course of an hour some of the thermostats would reach their set temperatures and would shut off their associated duct heaters.

With a furnace demand of 10 kw. and a possible demand of 7 kw. for range, water heater, and other household requirements, an over-all demand of 15 kw. might be expected at certain times, taking account of diversity. A customer, conscious of the cost of each additional kilowatt of demand, can easily hold the demand below this by manually adjusting individual thermostats, but an automatic demand regulator is a desirable addition. This heating system fortunately lends itself to economical and convenient demand regulation.

A demand regulator (not shown) is installed inside the furnace case. In this particular furnace there is a space in front of the plenum chamber which is closed by an inside sheet-metal cover. This cover and the outside cover were both removed in Fig. 4. The demand regulating equipment comprises a small current transformer on the meter loop, a thermal relay, a motor driven cam switch and a holding relay. The secondary current of the current transformer is put through the heating coil of the thermal relay which closes when the demand has attained a predetermined value. This starts the motor driven cam switch. The cam switch has, in this instance, five switches each controlling one or two of the thermostat circuits. When the thermal relay closes and the cam switch starts, all thermostat circuits are opened in about a minute. The switches are then closed in a predetermined sequence at intervals of about three minutes. An additional

Fig. 3—Exterior of electric furnace

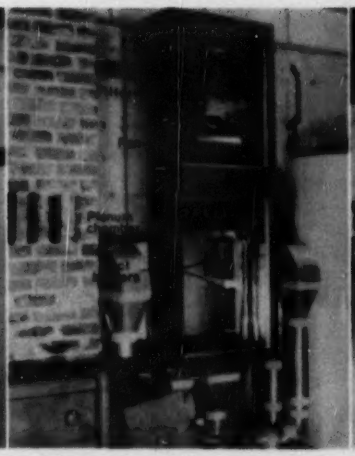


Fig. 4—Internal structure of furnace

Fig. 5—Duct heaters and contactors

switch on the cam stops and resets the cam motor after completing a cycle which takes 20 min. Upon completion of the 20-min. cycle, the regulator rests until the thermal relay closes again. If there is still excessive demand at the end of the cycle, the cam continues to run into another cycle. The room thermostats in this installation are put back on the line in this order: bathroom, kitchen, living room, child's bedroom, dining room and adult's bedroom. Any order wanted by the customer can be provided.

This system of regulating the demand requires less equipment and has other advantages in comparison with arrangements such as disconnecting the water heater. In this system there are no contactors needed in addition to those used for the furnace heaters. The half-hour demand is permitted to go nearly to the predetermined limit and the furnace is disconnected within about two minutes after the thermal relay has closed. One room heater is restored to the line in another three minutes. This permits the customer to have, in any one preferred part of the house, practically continuous heating even with close demand regulation. The other rooms are kept off the line only about 8, 11, 14, and 17 minutes respectively in each 20-minute cycle of control. These comparatively brief interruptions are not uncomfortable. This demand regulator is very inexpensive. The meter shown in Fig. 6 represents about 20% of the entire cost of materials for the regulator and it could be omitted since it is used only for installation calibration.

The upright installation of the furnace shown in Fig. 3 is somewhat unusual inasmuch as the furnace was put on the wall of the utility room to make it conveniently accessible for observation. Horizontal installation under the floor, where access is feasible, or suspension from the ceiling in a basement, gives shorter duct runs and makes it easier to suppress vibration. Attic installations are successful but the heat lost by the ducts, which is valuable under the house, is wasted in the attic.

The furnace used in this test was one of about 20 individually made units. Good results were generally reported. The installation cost was about 60% of that of conventional oil heating systems. Cost of operation reported in this test is believed to be about what ordinarily could be expected in the average well-insulated residence, and it could be less in many smaller residences.

Acceptable to Power Company

This kind of installation can be accepted as a load by the power company with relatively small plant expenditure. This residence is served along with four other range-water heater customers by one 10-kva. single-phase transformer. The service is an ordinary No. 4 3-wire drop as shown in Fig. 1, taken off at one span from the transformer. This span of secondary carries this house and one of the other four customers. The transformer is an old one that was installed several years ago when the first services were strung in this neighborhood. No installation costs were incurred by the power company for this heating load that would not have been made anyway just to serve the range-water heater load of the customer. The demand on the transformer undoubtedly exceeds the transformer rating frequently, and at times probably exceeds a 100% overload. Fortunately, however, the heating load occurs when the ambient temperature is favorable for the transformer. Satisfactory voltage regulation with overloaded transformers is possible with the unity power factor load characteristic of this type of heating system.

Acceptable to Customer

The results of this installation and test indicate that such electric heating can be attractive to an appreciable but limited number of ordinary residential customers. If they are widely distributed among ordinary range-water heater customers, the additional load can be carried with little if any additional capital investment by the serving utility. The same type of installation, where power supply is adequate, might be more widely adopted in residential projects with small well-insulated houses. These would require appropriate plant extensions, but the possibility of demand limitation and diversity indicated by Fig. 2 should keep capital outlay within profitable limits. In this test installation the power company's revenue is more than twice that which would be realized from an ordinary all-electric range-water heater customer. This additional load comes on largely in the morning, although it adds also to the evening peak. It is seasonal, but in this locality there is some heating load for at least eight months of the year. Considering the surprisingly small investment required to serve this load, it should become very profitable and well worth encouraging.

HELICOPTER WIRE STRINGING

STRINGING transmission conductor by helicopter is something entirely new. This revolutionary new method of laying out the stringing-in line enabled the Hawaiian Electric Co. to do a job in four hours that would have required three weeks by ground crews. Credit goes to James P. Michels of the Honolulu utility for conceiving and executing the idea.

The company was building a new 44-kv. line from its new Waiau power plant, near Pearl Harbor, to the Koolau switching station, in the hills above Honolulu. Construction crews were faced with the problem of cutting 25,000 ft. of stringing trail from tower to tower across the gulches, and building approach roads and trails up the ridges to the tower locations. Michels remembered that a local aircraft firm, Murrayair Ltd., had brought in a Hiller-360 some months before to use in spraying sugar cane crops. The plane was on another island, 186 miles away. A dry run was arranged there and 900 ft. of cable was successfully laid along a cane field road. This proved practicability of the idea.

Helicopter takes off (upper) with stringing-in cable in tow. Three weeks would have been required by ground crews working over brushy terrain (center) to do what helicopter did in four hours. Crew and officials (below) watch the test

Helicopter drags out stringing-in line at rate of 2,000 ft. in three minutes

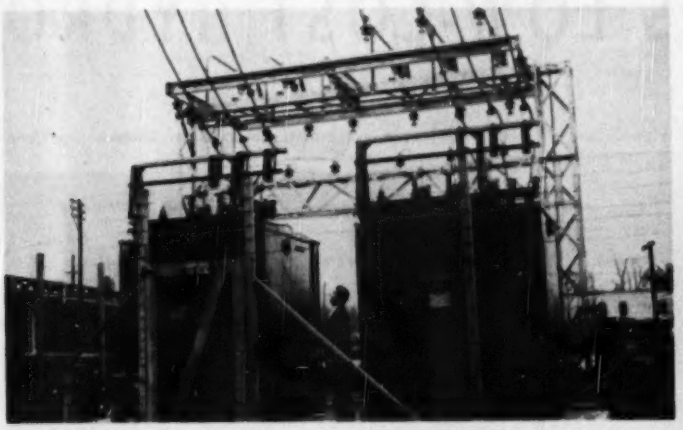
The helicopter was flown to Honolulu. The afternoon it arrived, March 2, it laid 2,000 ft. of regular ¼-in steel pulling-in cable on its first trial. The helicopter took the end of the reeled cable. The pilot was instructed to fly along the tops of the 60-ft. steel towers, letting the cable fall at the base of the towers. The pull was successful. It took only three minutes. Near the end, however, the drag from the weight of the cable became quite noticeable.

For the main job 23,000 ft. of ⅛-in. 7x19 strand carbon steel cable with a breaking strength of 2,000 lb. were obtained. Weight of the cable was 29 lb. per 1,000 ft. Five reels were used, one with 8,000 ft., two with 4,000-ft. pieces and two with 3,500-ft. pieces. These were taken up accessible ridges by truck to tower locations.

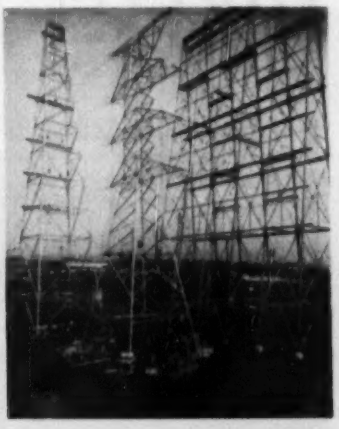
The helicopter pilot picked up the end of each reel, flew it slowly over to the tower on the next ridge, flew one or two turns around the tower and dropped his cable. A lineman was there ready to secure it. No effort was made to keep the cable taut and off the ground. It was allowed to pay out freely. Braking was used only to prevent the reels from running away. Laying the 8,000-ft. piece took only eight minutes. The operation had to be carried over an extra day, however, because it went so much faster than planned that not all reels were in place the first day.

It is estimated that 220 man-days of work might have gone into clearing a trail and dragging the cable in along the ground. Hawaiian Electric Co. actually paid for ten hours of flying time. Four hours of this was in flying the plane 186 miles to the scene and back. Two hours were spent in survey work and four hours in laying the line and demonstrating the flying technique to various personnel.

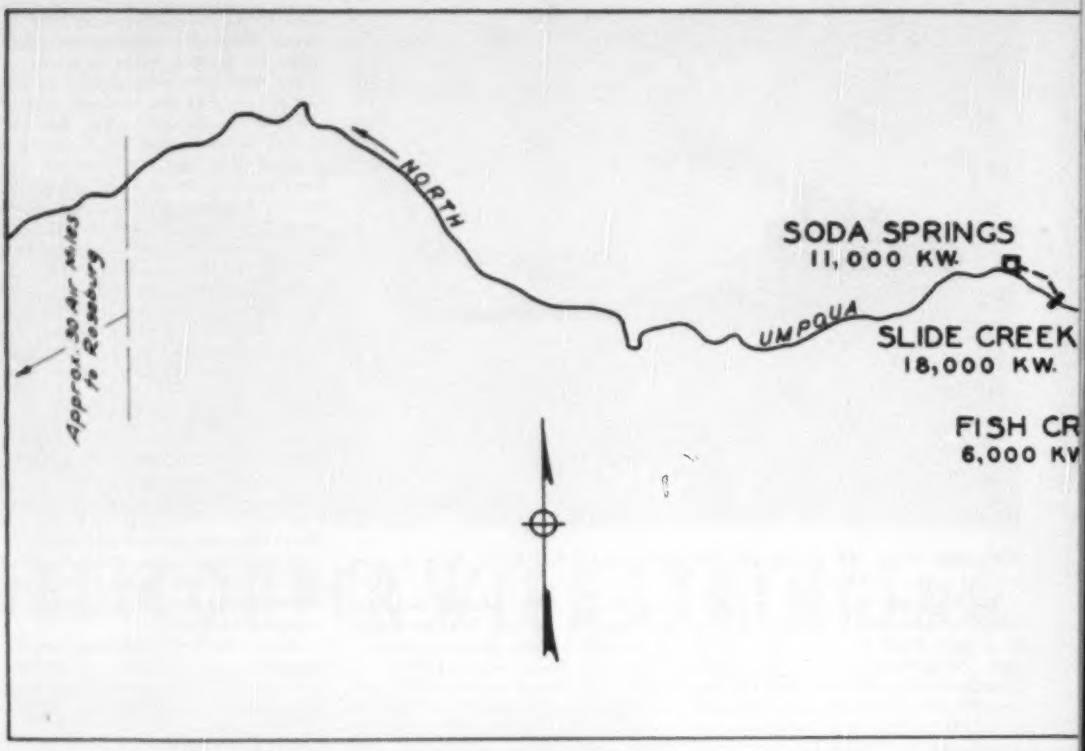
Cost of the experiment was not disclosed but it is believed the machine could be rented for about $50 an hour, including services of the pilot. Besides the tremendous saving in time, labor costs were cut 60% or more after deducting rental of the helicopter.



Unit substations installed by the City of Redding, Calif., to handle an unprecedented load growth of 60% in a single year. The phenomenal load growth of 60% compared to the 1947-48 winter is due to the influx of population and an increase in use of electric space heating. These two 2,000-kva. General Electric package units and a 12-kv. feeder to serve them is first step in the city's program to reinforce its distribution sytem to cope with such load increases. A 12-kv. backbone feeder will serve additional unit substations as required. These stations will step down to 2,400 volts to feed into the existing primary system of that voltage. Feeders will be kept short to give good customer service. The city of Redding purchases its power supply from Pacific Gas and Electric Co.

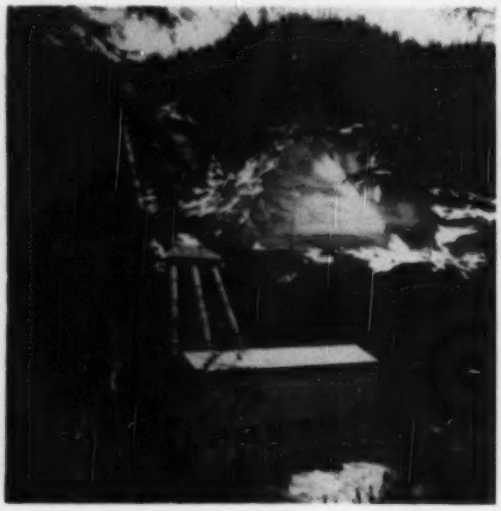


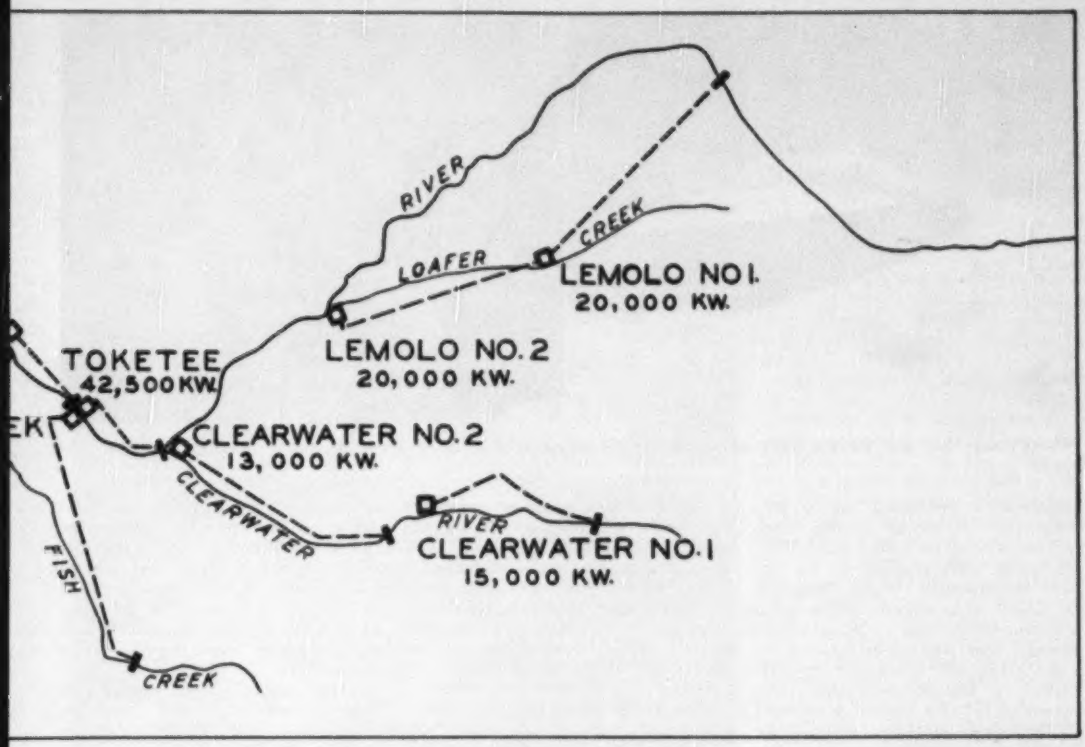
Testing the first transmission tower on Bethlehem Pacific Coast Steel Corp.'s new 160-ft. high-tower testing frames at the company's South San Francisco plant. Tower designed for Bureau of Reclamation is here shown under test. In the first test a combined horizontal pull in two directions totaling 122,000 lb. plus a vertical load of 24,000 lb. were applied simultaneously



TOKETEE IS LOW-COST HYDRO

Toketee plant (left) has first use of a Howell-Bunger valve (right) as a synchronous by-pass to control river level



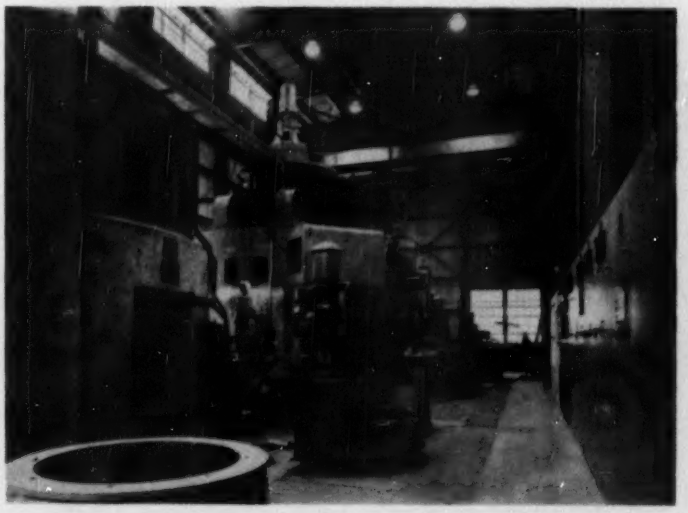


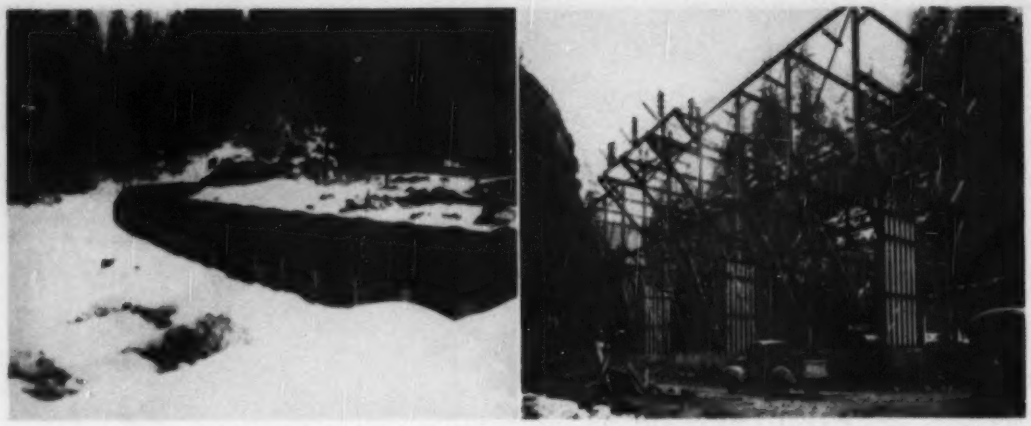
TOKETEE is the first to be completed in a series of plants under construction by the California Oregon Power Co. on the upper reaches of the North Umpqua River. The first of three 14,166-kw. units went on the line Dec. 15, 1949. The third was completed March 10, 1950. This eight-plant project will add 145,500 kw. by 1953. Total cost will be $26,300,000, or $180 per kilowatt. Toketee alone, with its 42,500 kw. costing $7,000,000, had a unit capital cost of only $165 per kilowatt. This is remarkably low-cost hydro. It is California Oregon Power Co.'s answer to the need for more low-cost power to meet the rapid load growth of southern Oregon.

The North Umpqua project is situated on the west slope of the Cascade Range, some 60 miles east of Roseburg, Oregon, and about 20 miles north of Crater Lake. Size, cost and scheduled completion of the eight plants will be found in the accompanying table. The head-piece sketch shows relative geographic location. With the exception of Toketee, which will be manually operated, all of the plants will be of the out-of-door type and will be remotely controlled from the Toketee plant. Adoption of fully automatic outdoor plants was an important factor in attaining the low unit cost mentioned.

The Toketee plant is characterized by its simplicity of design. The power house structure is of steel framework with asbestos-concrete siding. The three S. Morgan Smith, 21,200-hp., 400-r.p.m., Francis turbines and the three 14,166-kw. Allis-Chalmers gen-

Unlike Toketee other plants in North Umpqua project will be of outdoor type





Wood stave 12-ft. dia. flowline (left), circuit breakerless switchrack (right). Air-break generator switches only were used

erators are conventional, but the governors are of special interest. Each turbine is provided with a 24-in. Howell-Bunger valve supplied by the turbine manufacturer. These valves can be adjusted to operate either as a synchronous by-pass or as a purely pressure relief valve. The turbines are controlled by Woodward type-RH governors. The Howell-Bunger valve operating cylinder control is actuated by the compensating mechanism of the turbine governor through a cam. Acting as a synchronous by-pass the controls function to discharge a constant quantity of water regardless of load on the turbine. As a relief valve, the by-pass remains closed except when there is a sudden load rejection on the turbine. Purpose of the Howell-Bunger valves and the dual control arrangement is to make possible passing any predetermined desired quantity of water regardless of load on the plant, and thus be able to control water level down river. This is an important consideration in connection with many Western hydroelectric projects.

This is the first time a Howell-Bunger valve has been used as an automatic by-pass for a hydraulic turbine. An unusual feature of this application is that the valve discharges below water level. Thus the tremendous velocity of discharge is absorbed. This feature had been laboratory tested by the turbine manufacturer prior to its proposal for field installation. Its success in the Toketee plant probably will result in further use of the Howell-Bunger valve for this type of service. The pioneering spirit and cooperation of the California Oregon Power Co. and the S. Morgan Smith Co. in making this application is noteworthy.

The generators have shaft-driven exciters. Station power is normally obtained through a bank of Kuhlman dry-type transformers fed from the generator bus. In case of both plant failure and transmission line failure, emergency service will be provided by a 50-kw. diesel-engine driven generator.

Each of the three generators operates as a unit with its bank of step-up transformers. Paralleling is on the high side only. Each generator feeds its bus section through a 6,900-volt, General Electric, air-type circuit breaker. There are three banks of three, and spare, Westinghouse step-up transformers. Transformers are rated at 5,555 kva. each, making a bank capacity of 16,665 kva. Each bank feeds into the high-tension bus through a Delta-Star air-break disconnecting switch. Until a second transmission line is built, transformer protection is afforded by differential relaying on the transformer bank. This opens the generator air breaker and closes a Delta-Star spring-operated grounding switch on the transmission line. Operation of the oil circuit breaker on the other end of the transmission line is thus assured. There is not a single oil circuit breaker on the Toketee job.

Transmission is via a 50-mile, H-frame, wood-pole, steel crossarm, single-circuit, 250,000 cir. mil copper conductor line to Dixonville substation, near Roseburg. Two channels of communication were provided. One is a transmission line carrier telephone, and the other, space radio direct to the dispatcher's office in Medford.

Plant	Capacity	Completion	Cost
Toketee	42,500 kw.	Jan. 1950	$ 7,000,000
Slide Creek	18,000 kw.	Dec. 1950	3,200,000
Soda Springs	11,000 kw.	Oct. 1951	3,300,000
Fish Creek	6,000 kw.	July 1952	1,000,000
Clearwater No. 2	15,000 kw.	Oct. 1952	2,500,000
Clearwater No. 1	13,000 kw.	July 1953	2,300,000
Lemolo No. 2	20,000 kw.	Oct. 1953	3,500,000
Lemolo No. 1	20,000 kw.	Dec. 1953	3,500,000
	145,500 kw.		$26,300,000

Hydraulic Features

Water for Toketee is diverted by a low diversion dam on the North Umpqua River. The flowline consisting of 1,663 ft. of 12-ft. wood stave pipe line and one mile of tunnel, terminates in a steel differential-type surge chamber. A single penstock part way down the canyon side branches into three penstocks to provide the turbines with a net head of 448 ft. Storage features of the project will be developed later in conjunction with the Lemolo No. 1 plant. From a construction point of view it is interesting that all lumber, clay for dam core, sand and gravel, were obtained on the plant site. This fortunate circumstance also was a factor in attaining low unit cost.

The North Umpqua River project is one of the very few power developments to be undertaken by private utilities in the Northwest in recent years. The accompanying staff photographs show some of the interesting features of the Toketee development.

Contractors Who Sell— in Boise for Instance

ANOTHER electrical contractor who sells with ideas and up-to-date methods of merchandising with light is Ferd Koch of Electric Service Co., Boise. He too had basic training in selling as a utility commercial lighting man, hence he can and does design and engineer lighting as well as install it.

On this page are two examples of recent jobs.

At the top is the second floor, floor-covering department of Standard Furniture Co., Boise. At first glance at its dark ceiling the job might be considered a questionable lighting technique but in this instance it serves to keep the customer's interest down on the merchandise, not the store. In fact the rugs and furniture are spotlighted in a dramatic way. Lighting comes from 150-watt reflector lamps in Swivelier units hung on long stems from high ceiling. The lamp is well concealed in the unit and thus no glare results. Units are mounted on 8-ft. centers. The incandescent lamps give good color response. Over the rug racks Slimline lamps are concealed behind valances.

Another installation, employing the idea of zone lighting, was made in Carroll's, a womens' dress shop in Boise. The shop occupies two stores with connecting doorways, both of which have a mezzanine at the rear. In one (center) a single line of 8-ft. Sechrist two-lamp, louvered fixtures with glass sides, was mounted down the center of the high ceiling. Accent lighting in the display boxes along each wall comes from concealed lumiline lamps. Over the balcony area are recessed louvered slimline fixtures. Under the balcony, boxes were recessed between joists, painted white inside and strips with two 8-ft. slimlines installed in them, then shielded by a louver.

In many places Swivelier 150-watt spots were mounted to be directed at specific displays. The flower boxes along the balconies are accented also by hidden fluorescent strips. In the lower photo the back-of-counter boxes do not show the illumination provided by the slimline lamps mounted back of the frame. The attractive window display area makes use of Sechrist Adjustolites both to spot dresses on display and the garden shrubbery used decoratively. Everywhere close cooperation with the architect relative to color and light was maintained.

Fluorescent Maintenance What it Takes

Bert Osterman
T. L. Rosenberg Co., Oakland

Truck advertising and identification is important to sales

MAINTENANCE of lighting systems is necessary to keep light loss at a minimum. Light loss is paid for at the same rate per foot-candle as the useful light that reaches the working plane. Thus, lighting maintenance becomes an important economic consideration in the operation of the millions of artificial lighting installations now in use.

The need for lighting maintenance is no greater today than in the past, but the problem of doing a good job is more complicated.

A contractor is in business to perform a service and the company can only be successful by having satisfied customers. Service is purchased for a variety of personal or other reasons by these customers. All of them will expect full value for the money they pay out. Their satisfaction will be measured directly in terms of the service you provide. Therefore, your company must be organized accordingly. This means:

1. A sound financial structure and a good organization. The latter is assured by setting up a system for operating various phases of the business, then following each through to completion. In any event, considerable ingenuity will be required, not only to make up maintenance schedules, but to follow them.

What does a maintenance customer want? A prospect is interested in three objectives:

1. Retaining the intended level.

The prospect has made a substantial investment in his lighting installation to provide a definite level of lighting. Maintenance provisions should keep the lighting from falling below the agreed-upon foot-candle value. Wasted light represents wasted money. This point should definitely be emphasized. The remedy proposed, of course, would be planned lighting maintenance.

2. Maintaining the appearance.

Appearance is especially important in commercial installations. Lamp outages, blackened lamps and dirty fixtures do not add to the appearance of any store or office.

3. Keep maintenance cost down.

The cost of labor has increased considerably and management must plan and schedule work more carefully than ever.

Your customer and you must both profit! Certainly, your customer must be acquainted with the losses he faces through neglect of lighting maintenance. These losses will also present a picture to you of the size of your profit possibilities. Your total cost, plus a reasonable profit, should be within the customer's potential losses.

Some cost or loss factor limits can be calculated, others can be determined only through experience. This is particularly true of items involving labor, traveling time, parking problems, set-up time after reaching the job, worker's attitude, age of installation, position of equipment, floor obstructions, variations in fixture's height, interference by workers or customers at the job and the actual rate of dirt accumulation on lighting equipment. There are certain requirements that must be had in setting up a fluorescent maintenance business.

First of all, secure a truck big enough to carry the driver (who usually acts as the crew foreman, makes inspections and repairs) and two cleaning men; plus one, two or three stepladders of various lengths and a scaffold that should only be carried when needed. Space should be allowed for other parts of your stock in trade —lamps, starters, ballasts, wire tools and other similar necessities. Drop cloths for covering shelves or tables while cleaning the fixtures directly overhead should also be a part of your equipment. The truck has a fine advertising value if it is properly identified. It should have some sign, slogan or symbol.

The cleaning crew should be made up of two men. It has been our experience that two men are more effective than one, or two working individually. The term cleaning crew is appropriate because the operation demands teamwork. A cleaning crew, pleasant in appearance and manner, will play a successful role in the operation of your business. We find that every effort to glamorize this part of the work is worthwhile. Attractive uniforms, proper instructions and job training will be helpful.

The following are a few check points that we use as a procedure to be followed by the maintenance crew:

1. The driver, who is the crew foreman, checks in with the establishment manager or a designated representative, on arriving. The reason for the visit is then established.

2. The foreman makes several foot-candle readings in the area to be cleaned and records them on the regular form. He then leaves the crew there and goes to make other visits while the equipment is being cleaned.

3. We are always careful in handling materials necessary for the cleaning job. All such items are stacked neatly, without interfering with normal operations in the establishment. This applies even on night-time jobs, because the results of disorderly handling of the equipment will certainly be noticed by the management in the morning.

4. Arrange for hot water and detergents required for cleaning.

5. The driver returns before the job is finished to make necessary repairs and takes foot-candle readings after the job is completed. These values are recorded. Two copies are made, one for the customer and one for us.

So are uniforms for the men, and special safety platform ladders and also a wash truck to clean glass or louvers

We have daily operating schedules which tell our maintenance crew where to start its daily routine, what is to be done, and the location and purpose of other calls. Such a schedule not only helps develop an efficient crew, but gives the headquarters staff a fairly definite indication of the location of the maintenance personnel.

The schedule should be quite complete. As an example, the schedule for a typical unit would tell the driver where to take the two men who are primarily responsible for cleaning the lighting equipment. Here they are dropped off with the necessary material. The driver then continues to a different establishment due for a monthly service check-up. He continues his round of calls until his schedule indicates that the two men should have about finished their cleaning job. The driver then arrives somewhat before the cleaning is finished, to handle any servicing that may be required on the lighting equipment. When the work is completed, the crew follows a similar routine elsewhere.

The schedule also reminds the driver-repair man to call our office at least every hour. Thus, any emergency call received at the office can be handled promptly. These customer calls necessitate interrupting our planned tour of monthly checks, so some latitude is left in the schedule.

Our customers have the privilege of calling the company when something goes wrong. These calls are handled the same day—as a matter of fact, they are taken care of at a maximum of two hours after they are received. We have a 24-hour-a-day service which, of course, makes our selling job that much easier.

A very important point in the whole operation of maintenance is the way you handle lamp replacements. There are two schools of thought.

First, *group lamp replacements.* This means replacing all the lamps at one time. All lamps are removed as they approach the end of average life and a completely new set is installed. Remember that at the time of group replacement the best 10% of the lamps removed are reserved for interim replacements. Mortality curves in bulletins available from lamp manufacturers point out these principles. Such curves show that when 10% of the lamps are burned out, they have given 70% of their average life. In the next few hundred hours, another 10% of the lamps fail and in the following few hundred hours 20 to 40%.

Where appearance is a primary factor in a lighting installation, difference in brightness of fluorescent lamps may be important. Group replacement gives the best possible appearance, which can be well preserved by using lamps previously in service as interim replacements.

The second school of thought is the *individual lamp replacement.* With this system, lamps that have burned out are replaced during periodic visits. At the same time, the maintenance man quickly checks the complete installation and also replaces bad-looking lamps that are approaching their span of life. The replacement of these additional lamps reduces to a minimum calls for service between regular monthly checkups. If this operation is handled effectively, the customer calls will be nearly eliminated. We find that 90% of our customers are sold on an individual lamp replacement basis. At the time of selling, group replacement seems to be a little too expensive.

Starters are also an important factor not to be overlooked. Through our experiences we find that a starter that has thermal cutout is the best type to use. These disconnect blinking lamps, thus protecting not only themselves, but also the ballasts. This results in much longer starter life and better treatment of ballasts.

The T. L. Rosenberg Co. started its fluorescent maintenance division Aug. 1, 1947, at which time an intensive selling program was put into effect for one month. On Sept. 1 of the same year the actual operation of this division began.

Selling of lighting maintenance contracts is a very long process with 90% of the people on whom you call. It takes constant call-backs in order to get their names on the dotted line.

However, with the ever-increasing interest now shown in lighting maintenance, the sale of this type of contract becomes a little easier. Our accounts now number upwards of 110. Lamps that are maintained under these contracts number over 15,000. We are constantly striving to interest more users of fluorescent lighting to let us maintain their equipment.

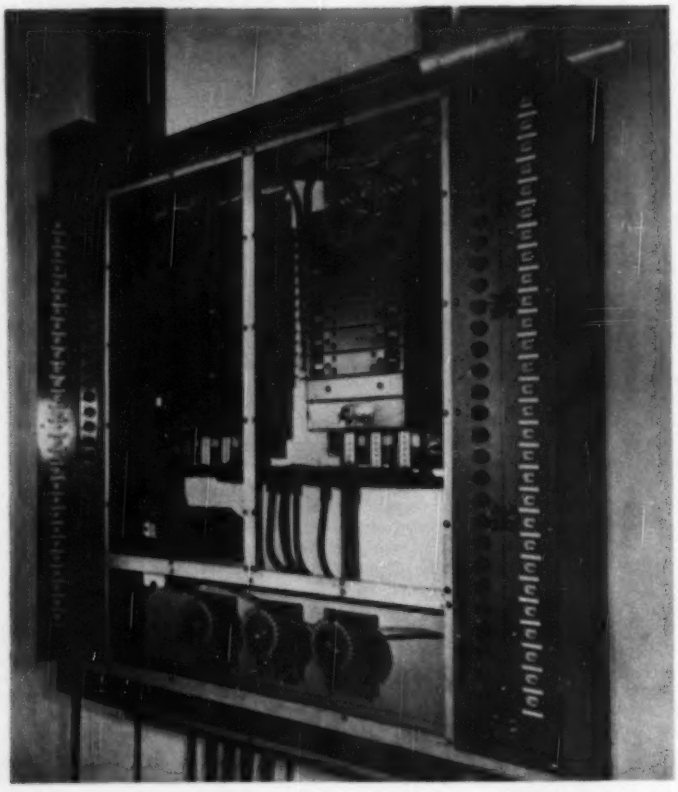
Other business derived from our fluorescent maintenance accounts is considerable and includes new electrical construction, new lighting installations, motor repair work, and remodeling of electrical systems.

To the time of writing, we have had very little assistance from the utility company.

Contracting for service work is not new. Similar contracts have long existed in the sign field. However, a service contract may be new to our prospects, so every effort is made to let people know that we are in business to stay and that we will honor the contract. The whole organization must favorably impress customers that they are dealing with an aggressive, neat, friendly, courteous company which gives quick, high quality service at a reasonable price. Your existence as a lighting maintenance company is tied up in one word—SERVICE!

Erb Memorial Union student recreational building now under construction on the University of Oregon Campus at Eugene

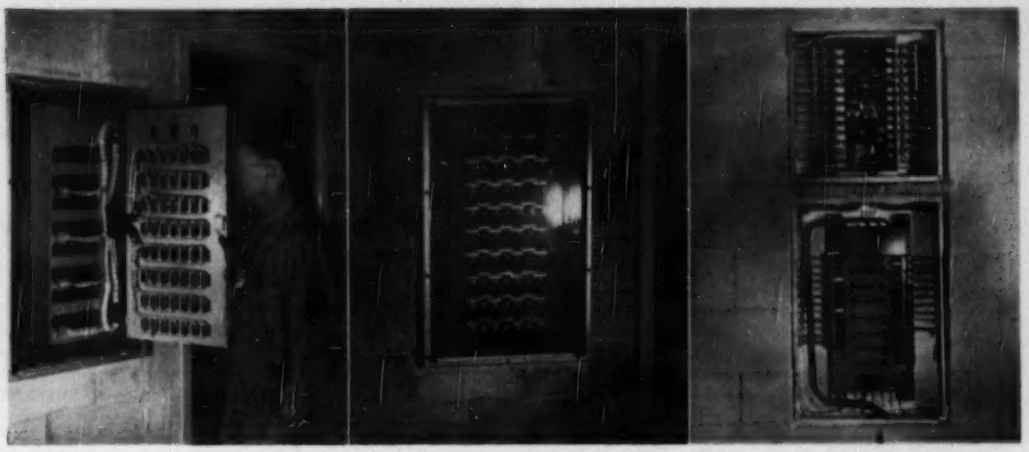
Low-Voltage Control Adaptation



Saflex low-voltage control adaptation made possible low-cost duplicate control of ceiling and stage effect lights. Effect of dimmer control also obtained

AN interesting adaptation of the Saflex low-voltage control system has just been installed in the Erb Memorial Union building now under construction on the University of Oregon campus at Eugene, Ore. This control system, manufactured by the Square D Co., was adapted by consulting engineer Ray W. Preston to the control of ceiling and stage effect lights in the multipurpose banquet hall. Its use made possible duplicate control of the 56 circuits involved from both stage and projection room. The system as installed saved the expense of full-voltage control by means of contactors and the raceways that would have been required for all the necessary wiring. In addition, because of sequence operation of the master relays, the system gives the effect of dimmer control. This dimmer effect is made possible because each individual light is controlled in rapid sequence by a single on-and-off master switch that operates a motor-driven master contactor.

There are individual switches for each circuit at both the stage and projection booth panels. The Saflex system utilizes 24 volts for relays and

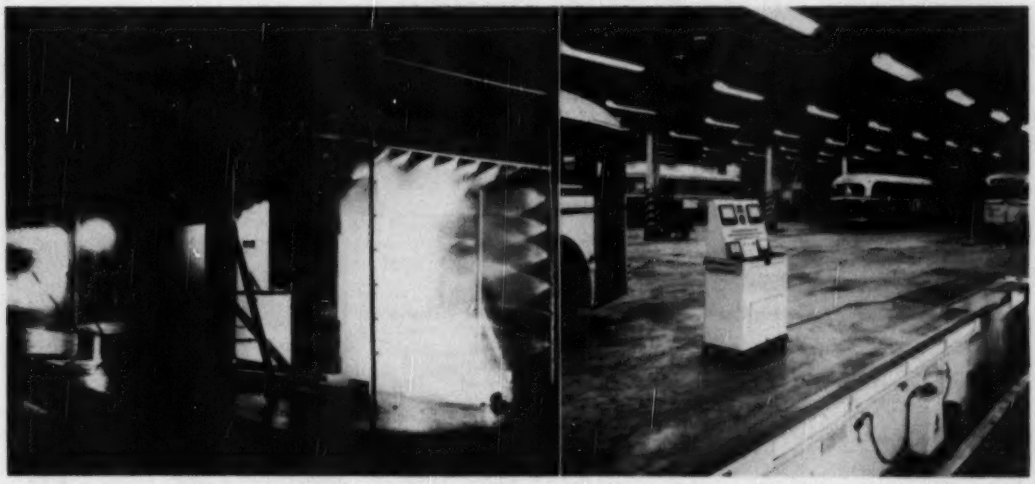


Projection booth panel (left open, center closed) gives operator duplicate control of 56 circuits of ceiling and stage lights. Right view shows relay cabinet above breaker-type panelboard in game room for master control lighting

low-voltage control wiring. In this adaptation of the system the relays are mounted in the stage panel, as shown. Here also are the multi-breaker panelboards for the 56 circuits, the individual switches for the various circuits, indicator bull's-eye lights, the master contactors, low-voltage transformer, etc. In the projection room all that is required is the simple panelboard shown. This consists merely of the on-and-off low-voltage switches for use when control is transferred to the projection room. Since the projection operator can see the lights he is controlling, it is not necessary to provide bull's-eye indicating lights in the panelboard in the projection room.

The same system was used to allow a single operator at the cashier's desk to control the individual lights in the three large game rooms in the basement. One of the accompanying photographs shows a neat and compact relay and circuit breaker panelboard installation for the billiard room.

This adaptation of the Saflex system is the forerunner of a number of other school and commercial installations of a similar nature laid out by engineer Preston. Lawrence, Tucker & Wallmann of Portland were the architects for the Erb Memorial Union building. Irwin I. Wright is superintendent of physical plant in charge of construction for the University. The electrical contractor was Morgan Electric Co. of Seattle.



Relighting of carbarns is an important part of the current modernization program of the San Francisco Municipal Railway system. Improvement of service facilities, with provision of adequate lighting, has been regarded as equally important to modernization of rolling stock. Examples of relighting are here shown. At the left are shown the new Geneva Avenue shops. Main working areas have twelve rows of Westinghouse FPC-100 fluorescent fixtures providing 25 to 30 f-c. Shown at the right is the bus wash-rack lighted by Westinghouse 500-watt type AH-14 floodlights

NORTHWEST ELECTRIC LIGHT AND POWER ASSOCIATION

Utilization Data Sheet No. 65

SUBJECT: Heat Pump Operating Cost
CUSTOMER: Utility Company District Office
SERVICE COMPANY: California-Pacific Utilities Company
DATA PREPARED BY: E. A. Nickelsen, Commercial Manager

A Marvair package-type heat pump unit has been in operation more than two years at the John Day, Ore., district office of the California-Pacific Utilities Co. It has given satisfactory service with but little maintenance cost since installation in January 1948. The unit, which is equipped with a 3-hp. motor on the compressor and a ½-hp. motor on the air circulating fan, utilizes water from the city mains as the source of heat. Conditioned air is delivered to the office space through two double deflection grilles. Air is returned via a centrally located air register and return air duct.

The office building, with a total floor area of 1,220 sq. ft., was constructed of 8-inch concrete blocks. Composition roofing on 1-in. sheathing is supported by frame construction. Walls and ceiling are covered with ½-in. sheet rock with walls furred to allow 1¼ in. of air space back of the sheet rock. Windows set in metal sash and doors were provided with no weather stripping. An average of 2 ft., 10 in. of space between the ceiling and roof contains no insulation. Four rooms having a total area of 810 sq. ft. and 8,000 cu. ft. devoted to customer reception and district office, engineering office and rest rooms, are air conditioned by the unit. The balance of the building space is used as a storeroom and is not air-conditioned.

A maximum heat loss of 68,460 B.t.u. per hour was calculated for the heating season at design temperatures of minus 5° F. outside and 75° F. indoors. Test data taken Feb. 11, 1948, provided performance data:

Minimum outdoor temperature	—2° F.
Average outdoor temperature (8:30 a.m.—5:30 p.m.)	13.6° F.
Minimum indoor temperature	72.0° F.
Average indoor temperature	79.2° F.
Kw. input	3.84
Water temperature—in	57° F.
Water temperature—out	44° F.
Temperature difference @ 270 gal. per hour	13° F.
Total heat output—B.t.u. per hour	42,340
Coefficient of performance	3.25

Operating cost records for the 1948-49 heating season are shown in the accompanying tabulation. Water purchased from the city of John Day at a cost of approximately 8.8c per thousand gallons is wasted to the sewer. During extreme weather, the unit goes into operation at frequent intervals and thereby maintains the desired temperature within one or two degrees of its thermostat setting. On days of minimum temperature, it operates at a load factor of approximately 75% and the operating load factor during colder weather is approximately 50% for the entire month. No complaints of annoyance from noise or vibration have been voiced by office personnel. Power consumption with annual heating requirements for approximately 5,700 degree-days has been satisfactory.

Similarly, satisfactory results have been obtained during the cooling season as indicated by data taken in July 1948. An average indoor temperature of 75.5° F. was maintained with outside temperatures averaging approximately 90° F. and with a maximum of 100° F. A coefficient of performance of 2.22 was obtained with 3.6 kw. power input. The refrigeration capacity at the time of the test was calculated at 2.38 tons. A B.t.u. per hour heat gain of 40,300 B.t.u. per hour at the design temperatures on the cooling cycle with outside temperatures of 100° F. at 79° F. wet bulb and inside temperatures of 83° at 66° F. wet bulb, was calculated. This load is somewhat greater than the capacity of the machine. However, operating personnel report that comfortable indoor temperatures have been maintained on even the warmest days. The reasonable annual operating cost with comfortable indoor temperatures during all seasons of the year precludes the possibility of consideration of any other type of heating and cooling equipment.

Heat Pump Performance
Office Building — John Day, Ore.
Heating Season Operating Cost—October 1948 - April 1949 Inclusive

	City Water Heat Source			Electric Power		
Month	Average Temperature Dif. °F.	Gallons	Cost	Monthly kwh.	Monthly Cost @ Low Step of Comm'l Rate (2c per kwh.)	Total Operating Cost
Oct.—'48	11.0	48,000	$ 6.30	655	$ 13.10	$ 19.40
Nov.	10.5	67,534	8.28	933	18.66	26.94
Dec.	11.0	97,845	8.79	1,472	29.44	38.23
Jan.—'49	10.0	181,492	12.98	2,131	42.62	55.60
Feb.	8.0	164,145	11.10	1,638	32.76	43.86
March	8.0	115,785	9.69	1,330	26.60	36.29
April	8.0	63,270	8.07	546	10.92	18.99
Totals		738,071	$65.21	8,705	$174.10	$239.31

ELECTRICAL WEST Contractors' News Letter

QUICK NEWS ON TRENDS, LAWS, CODES, MATERIALS, EQUIPMENT, COSTS, WAGES, ETC.

Vacation dike breaks

San Francisco, after fuming and fussing over Oakland's threatened "vacation" pay struggle the last two years wouldn't face up to it itself and gave **Local 6** a trick "vacation," actually a pay increase of 4% or 10c an hour on journeyman scale of $2.50 which the electrician is supposed to save and use to take his vacation when he can. **S. F. Electrical Contractors Assn.** voted on it March 30, to go in effect June 1. Result is bound to be scramble from all other locals in the West for the same, many having been satisfied not to seek wage raises this year with so many on the bench and work slowed down. Being priced out of work doesn't seem to occur to anybody.

Wage hike

Utah Chapter, NECA, lost its case before the **Council for Industrial Relations for the Electrical Contracting Industry;** will have to give the second 15c raise in six months. Pocatello now wants the same $2.30 scale. Chapter asked a lower residential wiring rate to put union contractors back in residential wiring; was turned down. Cannot compete with $1.30 to $1.50 scale paid for residential work in the area.

Train

General Electric will put a **9-car train** on tour soon to exhibit some 2,000 items of **industrial equipment and products** in each town it stops.

Packaged ceiling

Allen & Olson showed its newest thing in louvered ceilings at the **EMEA Industrial Electrical Show** in Los Angeles, March 15-18. It is a package of precut and fitted aluminum sheets that assembles quickly into an 8x8-ft unit, 1 ft. deep, concealing four slimline lamps in deep louvers, with low brightness but excellent light distribution, delivering 100 f-c on a desk.

Some show attractions

Among hundreds of other things shown and demonstrated at the **EMEA show** were Ramset guns banging studs into steel, concrete and wood; **Western Insulated Wire Co.'s** neoprene **Bronco** wires and cables; **Wiremold's Snapicoil** ready-wired plug receptacles for baseboard runs; **Porta-Drive** reversible power unit for use with hand drills to thread pipe; **Buchanan pres-SURE-tool** for splicing wires or affixing lugs; **Cloverdale** of Portland **cold cathode units** for hairpin tubes; **Electrical Engineering & Mfg. Corp.'s** custom built special motors and actuators at odd frequencies for high speed or torque, compact size; **Federal Electric Products'** new front operated switches and **"Protectits"** for fractional horsepower motors; and lots of others.

Contractors in it

Number of **contracting** and **industrial service** firms exhibiting was greater, too —**Hill Electric Co., Larsen Hogue Electric Co., R. A. Reed Electric Co.** and the **National Electrical Contractors Assn., National Industrial Service Assn.** and **Illuminating Engineering Society** each had booths. Contractors are prominent on the board and committees—**Richard Rogers,** Ace Night & Day Electric, **George Larsen** and **Ray Gunning,** Larsen-Hogue Electric; and **Henry Bush,** Littlejohn-Rouland; **John Benson,** Benson Bros.

All worked out

Sunbeam Lighting Co., (whose brilliant both at the **EMEA show** won a prize from purchasing agents selections) is using a new illumination computing system called **Lumigraph** to assist you to determine the number of its fixtures to use to light a room to a desired level. All catalog sheets will carry the four graphs to give all information desired.

Elevated

Friends of **Gano R. Baker** who have known him for his elevator work for Westinghouse since 1926 in California, a native of Denver and a University of Colorado graduate, will be pleased to learn of his promotion to be eastern district sales manager of **Westinghouse Elevator Division.**

On their own

The two **Vance** boys, **Walter Jr.** and **Jack,** separated from **Pacific Electric Motor Co.** of Oakland by purchase of interest by **Frank Boyd,** have started an industrial electrical contracting and motor shop, **Vance Electric Co.** at 1530 Wood St., Oakland.

Safe plate

Shok-Prul safety electric outlet plates, with a slide that covers the slots to prevent children from sticking pins in them, are being marketed by **Hayman-Standard Products Co.** of Philadelphia.

Also safe door

A **motor operated door mechanism** for garages and industrial buildings with a friction drive that holds the door in case anyone or thing obstructs the door, which cuts off current automatically, and which can be operated remotely either electronically or by low-voltage control, is announced by **Robot Appliances Inc.** of Dearborn, Michigan.

A break in glass

Dunbar Glass Corp. has developed a complete line of replacement glassware for lighting fixtures and portable lamps, and has a catalog illustrating more than 100 such parts, bowls, chimneys, breaks, fronts, globes, etc.

Booster book

Lightolier makes available to builders at small cost an attractive booklet illustrating home lighting fixtures for various rooms and featuring its **Lightronic** control.

School men's school

A **school planning meeting** is to be held at **Stanford University** May 19-20 sponsored by Charles Bursch, **California Division of Schoolhouse Planning,** at which school lighting will be a major topic. **Dr. Harmon of Texas** has been invited to address the group.

Agents' headache

The lot of the manufacturer's agent hasn't been made any easier by the **Washington Ten Percenter** uproar over Maragon and others. In government contracts now the law is being interpreted to mean that only bona fida manufacturer's employees can operate and commissions are also cut.

Ahead

Next **International Lighting Exposition** and conference, with **Merit Award** competition will be held in Cleveland, May 6-9, 1952. Long time planning!

District 8 Salt Lake

Edward J. Vanderlinde, president of **National Electrical Contractors Assn.** is expected for the **District 8 annual meeting** at **Salt Lake City, Newhouse Hotel,** May 5-6. The Utah Chapter has appointed a general committee headed by **Robert B. Swaner,** with **R. E. Bartlett, P. J. Bowman** and **E. E. Oberg,** on it, aided by **G. A. Howarth,** manager, to plan program and arrangements. Most of the program will be on Saturday, ending in a banquet. Topics will cover problems faced in electrical contracting these days. The district includes eastern Idaho, Montana, Wyoming, Colorado and Utah.

Locals make it

Two Utah firms, **Wasatch Electric** of Salt Lake City and **Cache Valley Electric** of Logan were awarded the electrical work for the big **Veterans hospital** to be built at former **Fort Douglas,** Salt Lake City, an annually well-equipped electrical installation.

All climates

A **weatherproof lamp holder** for outdoor lighting is being made by **Mattox Machine Co.** of Los Angeles. Made of cast aluminum, gasketed with a Silicone rubber ring which is heat and moisture proof, it can even be dunked.

Lamp moves

Sylvania Electric Products is getting its new place at Emeryville, across the bay from San Francisco, ready to move into. **Garlan Morse,** Pacific Coast sales manager, will keep an office at 111 Sutter St., San Francisco, but the rest of the staff will make headquarters for the bay area at Emeryville where offices and warehouses are provided. In **Los Angeles** the new branch assembly plant, warehouse and offices will soon be ready in **Vernon** district. **Seattle** will soon have a new warehouse and offices too.

Eye to eye

Art Vesco, San Diego's chief electrical inspector, holds a luncheon meeting the first Tuesday of each month to discuss code and interpretations with local contractors. Topics cover utility service requirements and rates, National Electrical Code, State Safety Orders, a proposed new code for San Diego, new materials and devices.

Artic encircled

John Majerus has recently organized an Alaska division of the **Puget Sound Chapter, NECA,** after a trip to Fairbanks to negotiate agreements with locals 1533 and 1547. He also heads a new code committee of **Electric Club of Washington** preparing a revised Seattle code.

Three for one

In case you didn't know, what used to be **Allied Industries Inc.,** manufacturers agents, has been divided into three—**Allied Industries** in Los Angeles with **R. W. Brown,** president; **Electrical Industries** in San Francisco with **J. A. Manning** heading it; in Seattle it's **E. A. Will Co.**

ELECTRICAL WEST Sales Guide

News Letter

FOR THE ELECTRICAL MERCHANT OF THE WEST

April 1950 c

Best answer to "price" was given at the end of the big G-E show, "Birth of a Salesman," which toured the West in March and April; "The other fellow knows all about his product. He should know what it is worth." The big show was an entertaining, professionally-produced, two-hour show, using the "Our Town" plot to tell the story of a town dealer and his search for a good young salesman. Half the cast were professional actors, half G-E factory men, who could act. It played to big audiences of dealers and salesmen in Denver, Salt Lake City, Seattle, Portland, Oakland, Fresno, Los Angeles, Phoenix and Albuquerque. Troupe 3 was headed by Babb Theleen, A & M Dept. sales mgr.

Good answer

You think you've got troubles? All who are not in Los Angeles please note what they are up against—discount houses, buying clubs, dealers issuing cards, 2nd floor deals, warehouse deals, liquidations, and now the AF of L issues cards to its thousands of members to put the bee on dealers for a discount. Fair Trade is evaded by slick tricks. Plenty of free and easy enterprising!

You name it, they've got it!

Meanwhile Macy's in New York is putting manufacturers on the spot to enforce Fair Trade or give it up. To combat discount houses Macy's has cut fair trade prices of one after another manufacturer. Soon other New York stores were following suit. Manufacturers were sending letters declaring their intention to enforce Fair Trade. Universal filed for an injunction against 12 retailers. Proctor has declared it will do so too. Others are saying the same.

Fair Trade showdown

TV highlights: February sales of TV sets in San Francisco totaled 2,246, 19% above January, bringing estimated sales to date for the PG and E territory to 37,600. . . Total figures for the Los Angeles signals reached 448,737 as of February. . . Mitchell Mfg. Co., well-established in the lighting fixture field, has made its entry into TV. Will concentrate for now on one model, the T-16, in two consolette cabinets, blond and mahogany, with a 16-in. rectangular "black face" tube. . . DuMont will bring out a 30-in. TV tube this fall for use in public places, schools, etc. . . Technicolor Motion Picture Corp. has bought the rights to a color TV tube from its inventor Dr. Willard Gear, University of Southern California. Tube uses three electronic guns, will convert present TV sets. Will be about two years before tube will be ready for the public, says Gear. . . Color hearings by FCC are over. Before they ended RCA showed a direct-view single color tube which all three systems could use. CBS President Stanton says they will continue to promote

TV concentrate

color. . . Denver dealers have organized a committee to circulate petitions for public signatures to ask FCC to expedite approval of a TV station for Denver, the only metropolitan area left without a station. . . TV set makers are cutting cooperative ad schedules as demand still exceeds supply of sets. . . Proctor is trying a complete switch of all of its advertising to TV in Philadelphia as a test. Is giving TV demonstrations of sit-down ironing.

Out of Washington Bureaus: Nothing doing on excise tax reductions so far and not much expected. . . Retail trade failures in 1949 were less in number than for any other branch of business. . . To kid itself that it has money the government may ask business to pay its income tax earlier. . . The housing boom is good for three more years. . . . The battle to tax the coops seems to have been bobbled by an undignified presentation; the coops played a smoother game, had the issue slipped to the FTC where its former official, John Carson, now sits. (What price "aid to small business?") — From D. C.

Bakersfield dealers, headed by NARDA director Phil Urner and President Booth of the local chapter, were staging an appliance show in cooperation with the local newspaper in late March. — Show

Mrs. Marjory Hume, home economist for San Diego Gas & Electric Co. was a winner of one of the McCall awards for individual effort, based on her "Home on the Ranch" broadcast program, featuring chefs of famous eateries and a cook book of their recipes. She went to the NEI conference in Chicago April 6 to receive it. — Honor

H. R. Basford Co. has notified its dealers that it has given up the Gibson line of ranges and refrigerators in northern California. A new deal is being developed but not announced as yet by W. H. Dennison, Western division manager of Gibson. Junius Jackson Distributing Co., Salt Lake City, recently staged a big dealer meeting to show the new Gibson line, featuring a new 18-ft. freezer of two compartment design, holding 630 lb. of food. — Change brewing

J. Noel, Jr., vice-president in charge of sales, Victor Products Corp., tours the West during the first three weeks of April with Lloyd Sutton, Victor representative for 5 Western States. — Swing

With the Spring Fair of Frozen Food and Refrigeration from April 27-30 at Balboa Park, an electric range campaign in San Diego County in May and an automatic coffee maker promotion in May and June, things are going to be lively in that area. The frozen food fair (details next issue) has brought in not only appliance people but the largest number of food processors, food distributors, meat packers, the butcher's union, the Locker Assn., grocers, delicatessens and bakeries. Home economists from nine firms will take turns turning out a meal in 30 minutes from frozen foods. . . The range campaign has a "true or false" questionnaire available at dealers' stores only as a gimmick, a meat thermometer as a prize and a door opener for the salesmen. — San Diego bursting out all over

Phoenix electrical dealers and the utility are working on plans to organize a promotional league similar to that in San Diego, Los Angeles, Salt Lake City and Spokane. — In need

National Electric Housewares Week certainly has been advertised to the trade. It now lies in the laps of dealers to make the most of it. The week—April 14-22. Every housewares maker has tie-in advertising and promotion material. — Let's go!

Willard F. Mellman was re-elected president of the Electric League of Los Angeles at the annual meeting March 13. With him were elected M. B. Sauer, Huntington Electric Supply Corp., vice-president; Howard K. Burdick, Dept. of Water & Power, secretary; D. C. Culbreath, treasurer and a board of 8 retailers, 8 manufacturers or distributors, 1 chain store, 1 contractor, 1 lighting fixture company, 1 utility, 1 appliance service and 1 TV and radio service representative, a total of 23. Activities outlined by W. F. Quinn, manager, include a freezer promotion, April 18, with the Herald Express and a big freezer sales school April 20; antenna regulations worked out with the fire department; a welfare and medical and hospital plan for members and their employees by Pacific Mutual; a new lighting fixture division.

L. A. League activity

Southern California Edison Co. has just released to all dealers in its territory copies of its 1950 business development program. It tells of the company's program to provide coordination of sales efforts and field supervision, dealer helps, promote adequate wiring, do school counselling, provide customers with kitchen plans, have a strong home economics program, establish electric living centers at its major offices, advertise with window displays, at fairs and exhibits, campaigns, provide sales manuals, and it gives a schedule of promotions for the year.

Program told

Clyde Allen has taken over the representation of Manning Bowman in southern California, with Paul Stunin as his Los Angeles representative. . . Kamper-Barrett Dealers Supply Co., San Francisco, has been appointed distributor for Fowler Mfg. Co. of Portland, makers of water heaters. . . John Gregory has left Dalco, Philco distributor in San Francisco. . . Ralph D. Kibbee has been appointed ad manager for Herbert H. Horn Inc., Los Angeles.

Changes

Packard-Bell, currently sponsoring wrestling on KGO-TV, is projecting the promotion to its northern California dealers with a TV window display contest running through April. Rules call for setting up an exclusive Packard-Bell wrestling window for one week, displaying at least one TV set. Dealers submit their own photos. Distributor provides display material free of charge. First prize--a Packard-Bell TV set; second a $100 suit; third a $75 wrist watch.

TV grunt and groan contest

Around April Thermador of Los Angeles will bring out a new unit for its built-in range line--a Bilt-in griddle made of stainless steel to match the other units. Grid measures some 174 sq.in. Will retail at $57.50 f.o.b.

Built-in griddle

Lightolier has increased its Decralite line with new designs and a wider variety of sizes. Offers a set of oil paintings as one of the latest additions.

More light pixs

First shipments of Speed Queen's new automatic clothes dryer will start this month. Uses a vacuum system instead of pressure blower. Dial control measures amount of moisture left in clothes by a thermostat; automatically shuts off when proper dryness is attained. Has push-button cycling unit. First models on the market will be electric, later gas.

Moisture measure

Samson United Corp. has a "stitch 'n' iron kit" with the 1950 model Samson fold-away iron plus needles, thread, etc.--all packaged in a lightweight plastic case. Designed for travelers, as a gift item.

Stich and iron

Here's a new slant on meter selling of appliances. International Register Co. is putting out a coin meter with "carry-back" bank, which operates on quarters. Coin bank is locked into meter case; customer removes once a month and brings to the store to make her monthly payment. Dealer has master key which opens the bank. Eliminates collection cost, also brings customer back to the store once a month. — Carry back

King Refrigerator Corp. of Glendale, N. Y. is planning a big merchandising and promotion campaign on its Kold-King refrigerator, with dealer tie-ins through local newspapers. Kold King has vegetable and fruit bin, 20-lb. frozen food capacity, adjustable glides for uneven floors. Backed by a five-year warranty. — New refer push

Kelvinator is out with an electric air drier designed for household or commercial use. Major parts are a refrigerator drier coil, finned condenser, Polarsphere sealed refrigerating unit, fan and motor and removable 10-qt. water container. Made of steel and finished in gray enamel. Suggested price is $149.95. — Air drier

Tijuana may have a TV station within 6 months, says George Rivera, owner-manager of radio station XEAC. Harold DeVoe, head of the local FCC office, reports there is no agreement between the two countries preventing Rivera from operating on Channel 6, one of four assigned to San Diego, if the Mexican government grants permission. — Mexican invasion

Lear Inc., makers of aircraft and marine radios, has a new Learavian portable radio, with three-band reception, built-in loop antenna, external antenna connector for increased range reception. Comes in alligator-type luggage case or mahogany wood case. — Portable

"Fans for Year 'Round Comfort" is a new electric fan manual emphasizing choice and use of fans for home and comfort. Goes into the history of fans, suggests proper sizes and how to get maximum efficiency. Designed especially for dealers, salesmen, home economists and student groups. Single copies will be sent free on request to Electric Fan Section, National Electrical Manufacturers Assn., 55 E. 44th St., New York 17. — Fan facts

Electric Ranges Section of NEMA is offering utilities an electrical cooking visual aids kit for education use, called "Electric Cooking--a Simplified Art." Kit will be sold at $7 a set. Available from Electric Range Section, NEMA, 155 E. 44th St., New York 17. — Cooking kit

Frigidaire has introduced a 115-volt automatic electric clothes dryer to operate as a plug-in appliance in conjunction with its automatic clothes washer. Has a special timer to eliminate redialing for extra drying time. Clothes are tumbled dry in a revolving drum similar to the 220-volt model. — Plug-in dryer

The "quick turnover" package, introduced by Sylvania, contains an assortment of 124 light bulbs in six sizes, packaged in a carton which can be turned into a light bulb department taking up 2 1/3 sq.ft. of space. Each package contains an envelope of displays to convert the carton into a merchandiser. — Light display

Service Clinic for Appliances

Keith L. Chamblin
California Electric Service Inc.
Los Angeles

AFTER many years of experience in the field of traffic appliance servicing in California, it became apparent to us that, to lift the sights of the whole traffic appliance industry, better appliance servicing was necessary. Therefore, to help improve this end of the business state wide, our first step was to publish a dealer service manual. This is in loose-leaf book form, containing such information as service hints, blow-up pictures of various appliances we service, a complete breakdown of parts and their costs, a complete catalog of a general repair parts line that we carry on all types of replacement elements and thermostats, together with the various cord sets and attachment plugs and a directory of all service stations in California on traffic appliance lines.

This manual was so enthusiastically received by more than 500 dealers that we decided to go one step further. We would conduct a service clinic or school to help the dealers in knowing how better to repair traffic appliances. The only charge for admission to the schools would be that the dealer have one of our manuals.

The second in a series of these clinics was conducted Feb. 25 in Los Angeles. It was attended by more than 85 dealers from southern California. They spent the complete day at the clinic while being schooled in various phases of appliance repairing.

Briefly, the outline of the clinic was as follows: We divided our schooling into five classes—one on irons, one on toasters, one on roasters and coffee makers, one on mixers and vacuum cleaners and one on electric clocks.

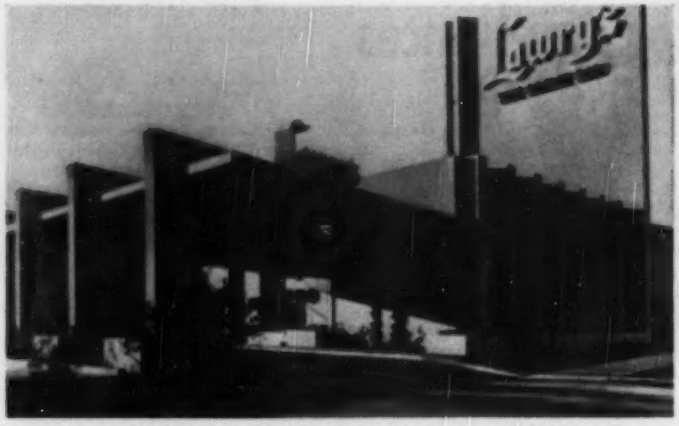
As dealers were welcomed at the front door they were assigned a group number. As a result we had groups of from 15 to 20. Promptly at 9 o'clock the groups were divided into the five classes, each class lasting for an hour. At the end of each hour interval, a bell would ring and the groups would pass progressively to another class. Thus, at the end of five hours every group had had an hour of schooling in each of the five mentioned service items.

At 12 noon we served a buffet-style luncheon prepared by the girls of our organization, and also had lunches prepared for those dealers who drove as far as 200 miles from out of town. These they could have driving home.

At the conclusion of our classes the group was assembled in the main auditorium or shipping department. There we had the pleasure of hearing Sterling Schimer, service manager of the Rival Mfg. Co., Kansas City, and Charles Skiff of the Waage Mfg. Co., Chicago. Each gave approximately 15 minutes on various phases of electric appliance servicing, together with our own effort in the field.

Both stated that this clinic was a progressive and forward step, one of the best undertaken by any appliance service station, and that it should go a long way in improving service conditions in southern California.

This clinic was so well received that we feel we will again be conducting them in the future at various intervals as new additions or new lines are taken on by the company. In that way the dealers in the field can be kept up to date on the methods of appliance servicing. Last year the first of these classes was held and at that time more of a lecture type of program was presented. It was felt, however, that the actual bench work practice would be more valuable now.



Famous prime rib dinner cooked electrically for ½c a meal. At right Ford - Lincoln employees cafeteria at Maywood

Why Not Sell More Commercial Cooking?

S. L. Cipperly

Southern California Edison Co.

BECAUSE of today's high cost of doing business, any type of new load to be promoted aggressively by a utility should have certain essential characteristics to assure an adequate return.

These factors are: relatively high revenue per kwh., low initial cost to serve, and a demand that is largely off the system peak—and they constitute an exact description of the commercial electric cooking load.

Southern California Edison Co. has long recognized the soundness of increasing this load, and prior to the war years was the leading utility in the nation in the amount of commercial cooking business secured. Now that the equipment is available again, and with a reorganized commercial sales organization in the field, indications are that 4,000 to 5,000 kw. of new load will be added to Edison lines from this source alone this year.

With 600,000 commercial food serving establishments in the country, utility sales executives are generally agreed that this kwh. market is one of the best prospects for new business ahead. Furthermore, the substantial advantages of electric equipment for the customer, the commercial kitchen operator, have been effectively demonstrated by thousands of successful installations. Especially noteworthy is the fact that many of the largest food serving operators are most enthusiastic about the all-electric idea—probably because their cost accounting systems and accurate knowledge of over-all costs have proved its economy.

The cost for cooking fuel represents only a fraction of one per cent of the restaurant gross revenue, and any small difference between electric heat and other fuels is offset many times by savings from electric equipment. Some of the large chain operators arrived at this conclusion after operating comparable establishments, some electrically equipped and some using other fuel. One chain operator states, "We could not maintain the quality of our food without maintaining the quality of our personnel, and we could not maintain that without clean, cool and light kitchens. Our kitchens are as comfortable as our dining rooms and offices . . . " —and this is possible only with electric equipment.

This business offers advantages and profit to both the buyer and seller, and is bound to grow and prosper. All that remains to be done is for the electric industry—manufacturers, utilities and dealers—to carry the story to the 600,000 food-serving establishments in the United States, and a tremendous new revenue for the industry will be developed. Here is the case for commercial electric cooking:

For The Utility

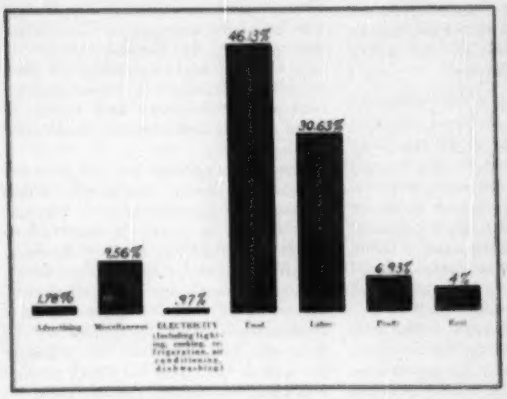
1. All the load is at unity power factor.
2. Load factor is high because food service places are open an average of 16 hours per day. Load tests show demands average only one-third of connected load.
3. Much of the load is off-peak because of night operation of bakeries and night clubs and food preparation for next day.
4. Low added investment in distribution facilities per dollar of additional revenue obtained, because load is available from existing customers in major established distribution areas.
5. Cost of obtaining this revenue is relatively low.
6. Low customer investment in equipment per dollar of E.A.R.

For The Customer

1. Cool, clean kitchens—better working conditions—less labor turnover.
2. Automatic controls—improves quality—saves time and labor.
3. Reduces meat shrinkage 5% to 15%. Saves 25% to 50% on frying compounds (fat).
4. Longer life of equipment reduces over-all cost.
5. Better kitchen planning possible, which saves floor space, saves steps, saves time. (Example: electric cooking surface with refrigerated storage beneath).

Standard Oil Co. at El Segundo, operates this all-electric kitchen which chef says produces tops in food and economy

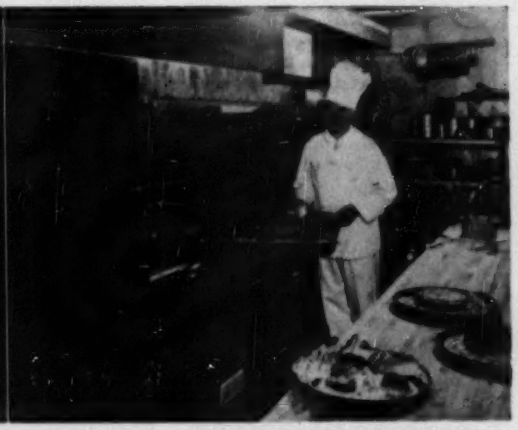
One of 31 all-electric cafeterias operated for employees by Pacific Telephone & Telegraph Co. in the Pacific area



Forum Cafeterias, large chain operator, standardized on electric kitchens, shows the division of its revenue dollar

Knotts Berry Place, in 15 sections of electric ovens, produces 37,000 hot biscuits and 1,200 pies for peak-day use

Whelan Drug Co. supplies its many retail outlets in southern California from electric kitchens at Vernon main plant



Brown Derby, in Beverly Hills and Hollywood, bakes its own deluxe pastries in an all-electric bakery shown here

Only simple display of parts in window because most service is from attractive trucks right at the customer's home

Make Repair Service Pay

IF any money is to be made out of servicing electrical appliances the business has to be efficiently organized. Otherwise high wages and high costs of doing business in this field can play hob with the income. There are so many places where the income can leak away, leaving less than wages for the proprietors. Such are the observations of Fred Hodge, president and manager of Electric Home Service Co. of Portland.

This company took on the responsibility of handling the servicing of appliances which both the utilities, Portland General Electric Co. and Northwestern Electric Co. (now Pacific Power & Light Co.) used to do with a sizable crew of their own.

In two years of operation the margin between success or failure seems to depend on:

1. An efficient and nearly foolproof dispatching system operated by a diplomat, one who likes detail and asks the right questions.
2. A fleet of service trucks fully equipped with repair parts and tools operated by diplomatic and skillful mechanics who also can sell and collect.
3. A quick follow-up on accounts for collection, and a carefully worked system of billing, both in the field and from the office.
4. A shop well equipped with time-saving tools and equipment to expedite service to those appliances which are brought in.
5. A large stock of repair parts of all makes and models and a knowledge of which are interchangeable or adaptable. Sufficient catalogs, price sheets, wiring diagrams to give accurate, ready reference both to the staff and the customers.

A centralized, large-scale appliance service operation of this kind has to have a basic philosophy and policy that includes these factors:

1. It is foolish for a homemaker to have to call 16 different places to find the one to get an appliance fixed. She should be able to call just one place for such service.
2. The whole transaction must be promptly handled in a business-like fashion. With mass volume it may be able to make a business like this pay without a high merchandising cost to sell it.
3. No competition with dealer customers. Sell nothing but the parts and repair service, no appliances, no house wiring. Carry licenses for both for supervising only and for an emergency, but never use them.

To go back to the reasons for these fundamentals, Electric Home Service Co. was formed in November 1948, when Portland General Electric Co. withdrew from appliance servicing. The company was formed by Hodge, who had been manager of districts for the company. In February 1949 Pacific Power & Light Co. withdrew from service work. Electric Home Service took over the trucks and stocks of parts of both and hired the basic crew of each utility.

Company organization now is as follows: Fred Hodge, president; Ralph Milsap, vice-president; Mrs. Virginia MacDonald, secretary-treasurer. Ken Martin, former PGE, is superintendent; Hal Moore, former PPL-NW, is assistant superintendent; B. B. Richards, former PGE, is bookkeeper; Jack Hepp, former PGE, is dispatcher. In June and July 1949 Lou Neely Range Co. and J. C. Stump Co., both service organizations, joined the company.

Procedure of a service call is as follows: Phone calls come to the board and are directed to the dispatcher if for service. He makes out a dispatch

Information taken on phone by dispatcher gives service man clue to the trouble

JOB NO. _____ TELEPHONE _____ All Out _____
NAME _____ Half Out _____
ADDRESS _____ Connect _____

Special	Refrigerator	Clothes Washer	Dish Washer	Water Heater	Range	
	Won't Run	Level Cycle	Off Cycle	No Hot Water	Pigtail	Recept
	Won't Freeze	Won't Pump	Won't Pump	Too Hot	Surface Units	Pilot Lights
	Leaks Gas	Leaks	Leaks	Leaks	Oven Units	Cooker
	Defrosts	Wringer	Impeller	Check Units	Thermo	Clock
	Won't Shut Off	Vibrates	Valve Stuck	Check Thermo	Switch	Leads
	Noisy	Noisy	Noisy			

15263

SPECIAL INSTRUCTIONS

Ken Martin, superintendent and Fred Hodge, president. At right, Jack Hepp, dispatcher, with rack to hold tickets

ticket (illustrated) in duplicate, on which he notes answers to questions asked of the customer regarding the trouble. This gives the serviceman a clue as to parts, tools or adjustments necessary.

In front of the dispatcher is a rack with 10 pockets for each of six districts. At the end of each day the list of jobs is made up from the dispatch forms for the next day for each man. He leaves in the morning with a day's assignments. But he also calls the dispatcher by phone before leaving a district, to take care of any urgent emergencies.

The service man makes a job ticket in triplicate for each job. The original goes to the customer. Two carbons go to the bookkeeper. One supports the cash or charge. The triplicate is kept in a customer history file.

For charge billings an invoice is made out in five parts on a snap-out form. The original goes to the customer. One yellow carbon is kept by management for a study of costs. A green carbon goes to a sales ledger. A white copy is held for a 30-day follow-up if the bill is not paid. The last copy is on ledger card and remains a ledger record in the files.

Accounts are billed within three days of the work, and are given 30-, 60- and 90-day follow-ups and, if unpaid, are taken to small claims court.

To encourage cash collection on the job, a prize of $5 a week is offered the service men. Awards are based on the ratio of cash to charge for all calls made by the man. Ties are split between the men. When the utility was handling this work the percentage of charges to cash was 65% charges to 35% collections on the job. Electric Home Service now gets 60% cash and 40% charges.

Originally started to service ranges and water heaters, the company now covers washers, ironers, dryers, table appliances, refrigerators, freezers, floor lamps, mixers—but no radio. A large stock of parts for all kinds of appliances is carried.

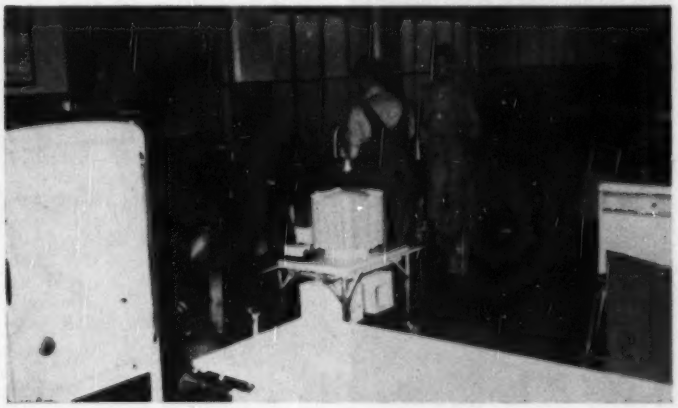
The men take the service truck home with them at night. Pride in his own truck is developed in the service man. The trucks are painted attractively in yellow. Each man likes to load his own truck differently so that he knows where parts are. There are 13 trucks and a pick-up. Each of the 13 carries about $1,500 worth of parts and tools. With such equipment the men complete 75% of the jobs on the first call. Each man carries the responsibility for his truck and contents and replenishes stock from the main stockroom. The scattering of the trucks each day and night diversifies the risk in case of fire.

There are some 225 retail outlets in the Portland area selling appliances. Some are trying to do their own servicing, although most of them lose money on such operation. At first many dealers were reluctant to send customers to Electric Home Service but now know it is not a competitor. Thus the business gradually grows with both warranty and out of warranty work. Many large retail stores have given up their own service departments, having this service available. Contractors send in many customers because they dislike to fuss over small repairs, knowing that this company does not compete with them.

Operating experience so far indicates a slim margin of profit as yet because of two pressures. To attract the service work requires furnishing skilled labor, and skilled labor is high-cost labor. The public, on the other hand, is not used to paying what the service is worth. For many years the utilities subsidized the cost in order to encourage electric usage. Now that it must be borne by the customer, the price seems high, especially in comparison to purchase of new appliances.

So Hodge asks this pertinent question: Will the public pay the cost of this skilled service? It does so in the automotive industry. It does so in plumbing. Will it do so for appliances? Time will tell.

Stump brothers who joined company and run its refrigerator and washer repairs



Layout of underfloor hot water radiant heating system for brooding studies at the State College of Washington, Pullman

Farm Electrification Research Pays Dividends

J. W. Martin

Department of Agricultural Engineering,
University of Idaho

RESEARCH facilities of the colleges and universities of the Pacific Northwest have contributed much to the success of farm electrification. An outline of a few of the research projects currently active will show the diversity of applications and at the same time indicate the opportunity for future investigations. All of the major schools are engaged in some form of research activity under the direction of people in the department of agricultural engineering. This summary will simply highlight a representative group of investigations.

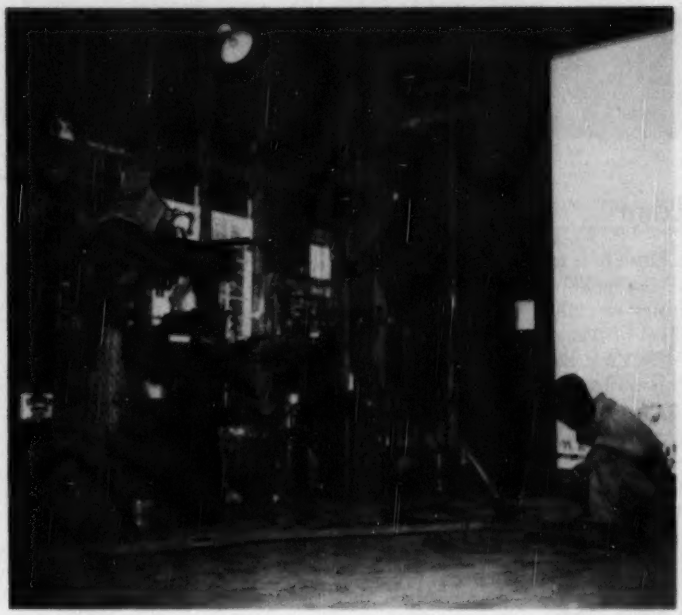
Oregon State College Agricultural Research Foundation (now in its 15th year) is furnishing concrete help to farmers and the electrical industry with such investigations as the following:

Testing of Small Home Milk Pasteurizers.—These units were tested for electrical characteristics, effectiveness in destroying milk-borne microorganisms, and the effect on milk properties. The pasteurizers were of the one- and two-gallon capacity and equipped with 300-watt to 1,275-watt heating elements. It required from 105 to 120 minutes to pasteurize the milk. The units range in price from $29.95 to $49.95.

University of Idaho began its farm electrification research in 1925. Here a milk can sterilizing lamp is tested

Corn Drying.—The purpose of this work was to determine the feasibility of drying ear corn in cribs under Willamette Valley conditions and to test the operation, performance and economy of a small portable dehydrator. The results obtained showed that a small portable dehydrator was capable of drying ear corn. The cost for fuel and electricity ranged from 5.16 cents to 5.78 cents per bushel. The moisture content before drying ranged from 32.95 to 38.55%. After drying the moisture averaged approximately 12%. The dehydrator could be used for other drying operations, such as drying of hay.

Gladiolus Bulb Storage Studies.—This work was to develop a method and equipment for drying gladiolus



Many emergency jobs can be handled right on the farm in an electrified shop. Note the welder, air compressor, power grease gun, paint spray outfit and overhead hoist in shop shown at left

corms after digging in the fall of the year to prevent spoilage due to "rots" while in storage. It was concluded that drying of corms at 96° F. for 24 hours in trays with air velocities of 200 ft. per minute provided excellent curing conditions. No corms were lost after an 80-day storage period at storage temperatures of 50° F.

The State College of Washington has been investigating and publicizing new uses for electricity in agriculture for 25 years. Among its recent projects are these:

Radiant Heating Panel for Brooding Chicks.—Tests were conducted on the use of a radiant heating panel placed on the floor under a conventional 4x8-ft. hover. During the test period of 9 days 160 kwh. of electrical energy were used for brooding 640 chicks.

Brooding Studies.—A poultry experimental laboratory has been completed and tests are now under way to compare the following methods of brooding: (a) butane hovers; (b) electrical hovers; (c) underfloor radiant heating with electric heating cable and (d) underfloor radiant heating with hot water system.

High-Pressure Pumps for Cleaning Poultry Houses and Equipment. — Work of developing a high-pressure cleaner for the poultry house and equipment has been continued. Results of previous tests were used to determine discharge pressure and capacity of the new pump. A 2-hp. unit operating at 500 to 600 lb. per sq. in. has been developed at a cost of $279.75. It was possible by presoaking to clean a 10x19-ft. poultry house in 15 minutes. The work has been summarized by saying that: (a) power equipment does a better cleaning job than could be attained by hand methods and (b) power equipment would clean more than twice as fast as the best hand cleaning methods.

Bean Drying.—A project has been formulated to study the problems of drying seed beans. Damp weather during bean harvest causes thousands of dollars worth of beans to be lost because they are too wet to be stored.

The results of several tests with an experimental bean dryer were summarized as follows: (a) an average of 3 kwh. of electrical energy was required per pound of water removed; (b) drying operations increased the per cent of cracked beans and (c) germination of the beans was not affected by the drying operation.

University of Idaho began its agricultural electrification research in 1925 and has published scores of bulletins to aid farmers in the economical and efficient application of electric power to farm tasks. Recent studies include the following:

Electric Heating Cables for Poultry Water Systems.—One 130-ft. length of 110-volt, 375-watt, Roberson "Heatsum" cable was installed along 50 ft. of ¾-in. iron pipe. This cable was to protect 4 ft. of automatic "Dew-Drop" poultry drinking fountain. The installation was very successful and a poultry man could well afford the $16.20 installation cost and the $6 seasonal operating cost to protect the system from freezing.

The Use of Infrared Heat Lamps to Prevent Freezing of Stock Water Tanks. — This experiment was conducted to see if heat lamps were practical and economical in preventing water tanks from freezing. A 250-watt infrared heat lamp was installed 24 in. above the water level. The lamp used 203 kwh. of electricity over a 30-day test period. This was 6.77 kwh. per day. To reduce installation costs no thermostat was used and the bulb was in continuous operation. It is estimated that a 47% saving could be made with a thermostat.

Infrared Brooding of Pigs and Lambs.—During the cold early spring days it was found that a new born lamb which usually would be wet for 12 to 24 hours could be completely dried in from 2 to 3 hours with no apparent harm from the heat lamp. This is an important factor during freezing weather. Day old pigs were found to spend more time under the infrared brooders than under a normal incandescent type. No cost was involved in building an elaborate brooder—just hang a heat lamp from the ceiling and protect it by nailing a two-by-four across the corner of the pen.

Farm Electrification Leaflets. — These consist of a series of bulletins distributed in quantities as great as 35,000 copies. Newest are No. 5 dealing with electric motor applications on the farm; No. 6 on adequate wiring which gives basic information on wire sizes for new construction and remodeling; and No. 7 which treats with various electric heating applications.

Continued research in the colleges and universities will bring out many new uses for electric power in agriculture. Limited investigations with electromagnetic radiation, infrared, ultraviolet (bactericidal) and visible portions of the spectrum indicate immense possibilities of income-producing value to the farmers. Early results with ultrasonics and high-frequency radiation for the treatment of plants and animals appear promising. Time and motion and safety studies could do much to improve farm operations and farm living.

ELECTRICAL WEST

Never Too Late to Learn

"I BELIEVE in free enterprise. Explain it to those who don't, not to me." So spoke a business man in the electrical industry recently in criticism of what he called a flood of literature coming across his desk. We didn't test his knowledge but we'll wager that his ability to speak in behalf of the American productive system is no better than the vast majority of his fellow business men. In all likelihood, he would stammer and fume and end up almost speechless in a debate with a socialist. "He would sputter, but he would not explain. So we urge that each and every person in the electrical industry study and learn a little about free competitive enterprise. And then talk about it—to friends, to co-workers, to anyone who will listen. That is a small price to pay for the salvation of freedom.

One Man's Philosophy

THE unprecedented appearance of Secretary of the Interior Oscar Chapman before the Federal Power Commission in the Kings River case rehearing last month is of more than passing interest here in the West. The whole future of hydroelectric development will be affected if his testimony before the FPC is accepted without reservation. For Secretary Chapman not only inferred but stated that the U. S. has followed the socialistic path to the point where all future water power development should rest with the federal government.

In attempting to win a reversal of the FPC decision that granted a license to the Pacific Gas and Electric Co. for power plants on the Kings River, Secretary Chapman contended that FPC had no authority to grant licenses to private companies on that stream for power developments because the Kings had been incorporated into the over-all Central Valley Project. The final decision, he said, would "have a vital effect in continuing or reversing a national public power policy to which this government is committed." Such a policy, according to the Secretary, stems from the philosophy that "large-scale public power development is for the common good."

If the FPC accepts Secretary Chapman's policy interpretation, then its own jurisdiction over future hydroelectric developments is gone. It will have none, and its status will be reduced to that of a statistical agency. Future hydro power sites would be reserved for the federal government. We don't believe that either Congress or the people ever intended that should happen.

More Business in Politics

EVERY business, large or small, is affected today by a multitude of political considerations. And the electrical business, seemingly, is touched by politics in more places and on more levels than almost any other. Hence the plain statement of W. C. Mullendore, president of Southern California Edison Co., before a California legislative committee, on the political attitudes and political ineptness of business managers might well serve as a guide and a challenge to everyone in the electrical industry.

The business management group are "pretty poor performers" with respect to the political field, Mr. Mullendore told a committee hearing on lobbying. Business men do a good job, he said, "of protecting the properties for which we are trustees and managers, against the natural hazards; but we do not do such a good job of protecting them against what may be called the political hazards, largely because most of us are timid, inept and clumsy when it comes to the field of our relationship with government." Because government and politics are the most important factors in economic life today, he believes that business men should be most concerned. He says:

"Government policies of taxation, of regulation, of expenditure for public purposes, of competition in the business world, of subsidies, grants-in-aid—in short, all the policies, activities and attitudes of those in government are by far the most important single influence and factor in the business world in America, as well as elsewhere today. Hence the necessity and importance of a mutual understanding between the business manager and the man in government of each other's problems; and the critical importance of avoiding so far as possible the

EDITORIAL VIEWS

erection of any unnecessary barriers of suspicion and distrust between the citizen in business and his fellow-citizen who is endeavoring to serve him in the field of government. It is not discouragement but encouragement of a closer relationship between those charged with responsibility in business and in government which should be sought today."

There can be no disagreement with that.

Competition in Contracting

THIS is supposed to be a profit system under which business is operated. Socialism is that under which no profit accrues to anybody. Lately from the way competition has been running in the construction field one wonders whether the individualistic last stand enterprisers, electrical contractors, have given in to socialism as they often do to union demands. Perhaps the social gains the unions demand are all part of the program to wreck the profit system, for centainly they leave no profit between wages, material costs and price, the way prices have sunk in bids lately. Wholesalers, too, tired of being played for suckers to bail out a contractor's low bid, are adding to the squeeze. Something has got to give. It appears that it is the contractor.

Glamor is as Glamor Does

RIGHT now Television is the glamor gal of the appliance and radio business and, like many a glamor gal, she has all the boys crowding around. But can she cook?

In two sentences and one metaphor that is the situation in areas where TV is broadcast. Nobody seems to be doing anything in "white goods," such as ranges and refrigerators, washers and sinks; still less than nothing in table appliances, now called electrical housewares. TV is getting all the advertising, all the selling —and all the customers' money with which to buy appliances of all kinds. At the appliance shows lately TV gets the play. There's hardly a toaster in the auditorium, much less one being demonstrated. Full page ads scream of low TV prices, making one wonder if the business is even profitable.

This neglect of other appliances is hardly healthy for a dealer's business. It should be balanced and serve all the electrical needs of the community.

And one forgotten factor in all this chasing of the glamor gal is that TV doesn't mean much to the utilities, but other appliances do. This neglect of the load builders is temptation for them to get back into direct merchandising in order to protect their own business, something that dealers have protested against vigorously in the past. Some of the manufacturers who sold heavily through the utilities are urging them to do so with very convincing facts and figures. Dealers who believe they should do the direct selling can hardly afford to neglect the kind of appliances that the utilities need to have sold for the glamor of TV. The romance may be short lived.

You Can Say That Again

MANY a nation has fallen because the doctrine of bread and circuses has sapped the political vitality of its people. Government aid is one thing. Government gifts are another. We do not wish to breed a generation of citizens, born hands first instead of head first, expecting the government to put into their hands what the honest efforts of their own heads would later bring them.—Dr. Rodney A. Yoell, Physician, San Francisco.

FARMERS and business men together are the only ones who can preserve for posterity the privileges, rights and freedoms of the American productive enterprise system. Big Labor could do it, but it prefers to squeeze the goose to make it lay more golden eggs. Big Government could do it, but it thinks that if it eats the goose, it can lay the golden eggs.—Ed Lipscomb, Director of Public Relations, National Cotton Council.

Industrial Show

MORE maintenance men, plant executives, managers, superintendents, purchasing agents, engineers, contractors, wholesalers, electricians, lighting engineers and utility men flowed through the fourth annual Industrial Electrical Show staged by the Electrical Maintenance Engineers Assn. of Southern California, at Shrine Auditorium, Los Angeles, March 15-18, than ever before. It was a bigger show, had more exhibits, more aisle room to circulate in, stop at the better than ever exhibits and hear the story of new products than previous shows. More than 12,000 attended; the 80 exhibitors showed products of more than 200 manufacturers. Although admission was free, tickets were given only to those directly interested in the business.

A feature of this year's show was the selection of three "best seller" exhibits by the Purchasing Agents Assn. of Los Angeles to receive certificates from the Industrial Advertising Assn. of Southern California. Winners were U. S. Electrical Motors, Westinghouse Electric Corp. and Sunbeam Lighting Co. Other attractions were door prizes each afternoon and evening and a show queen, Peggy O'Connor, 20th Century-Fox starlet.

Unique thing about this show is that it belongs to and is run by the members of the EMEA, even to erecting the burlap backgrounds, running the power feeders of trolley duct which it owns. EMEA rents the auditorium, sells and services the exhibit spaces, does the advertising and promotion, and what profit accrues goes to support the organization during the year. The members themselves put in a tremendous amount of work and enthusiasm.

Show committee this year was headed by Frank J. Rohring, Southern California Edison Co., director; with Ray Gunning, Larsen-Hogue Electric Co., on contracts; John T. Benson, Benson Bros., electrical facilities, assisted by Ralph Weston, city of Culver City; Henry Bush, Littlejohn-Reuland Corp., entertainment; Henri Ledeboer, 20th Century-Fox, properties; George Larsen, Larsen-Hogue Co., publicity; Henry Bente, Ralph E. Phillips Co., door prizes. Harold Davis, General Electric Co., is president; Richard Rogers, Ace Day & Nite Electric Co., secretary-treasurer; Marion Allen, executive secretary.

Pictured: Top, crowds filled exhibits each night; center, some of the officers and show committee; bottom, two of typical exhibits get strong play

Quick Catch-up

Billed as "the biggest show of its kind on earth" contractors, architects, plant managers and others in Washington are viewing a series of exhibitions of wiring materials and supplies and hearing informative and selling talks about them, put on by electrical manufacturers representatives and sponsored by the Electrical Contractors Society of Washington. The sixth of the series was given in Seattle, March 1, followed by one in Mt. Vernon, March 16, and Aberdeen, March 30. Others are due in Chehalis April 12, Port Angeles April 27, Longview-Kelso May 11 and Vancouver, Wash., May 12.

Following a pattern conceived by Arthur Siegal, ECS president, Selo Electric Co., Seattle, T. Ralph Neilson, manager, handles the mechanics and publicity for the shows, scheduled about every two weeks with the exception of two months during summer.

Ten to twelve manufacturers' representatives are exhibitors at each show on a rotation basis, each having a chance to make a "pitch" on his products to the audience. Doors open at 6 p.m., a free dinner is given the contractors and architects, journeymen and maintenance men attending. Cost is shared by all exhibitors who thus get a chance to contact and sell a large group at relatively low cost.

The program of talks on products usually runs an hour and a half, the remainder being used for demonstrations and viewing of exhibits. Exhibits are simple, table-top displays. Although all merchandise is not new, much of it has not been pushed enough by wholesale salesmen with thousands of items to sell or take orders for.

Exhibitors so far have included General Electric Co. lamp and construction materials departments; Federal, shown by Shafer-Nelson; BullDog by Coast Electric Mfg. Co.; Wesix by C. S. Hicks; Rome Cable by Kenneth Arnett; Ramset by Cascade Suppliers; National Electric Products by Norm Bost; Continental Radiant Glass Heat by C. E. Warren; Scotch Tape by Ralph Henderson; Trade Wind fans by Ellingson; Sieber by Norman Emden; Northwest Agencies; Anaconda Wire & Cable by Lloyd Wolff; Smith-Craft Lighting by Penning; Powder Power by George Rossman; Nu-Tone chimes by Wolff. Many have signed for future showings and many have reported increased sales of merchandise displayed.

Other results are an improvement in trade relations, better understanding of other branches of the industry by contractors and a sales outlook brought about by this constructive type of association program.

NWEL&PA

Plans are rapidly taking shape for the two larger section conferences of the Northwest Electric Light & Power Assn. The Engineering and Operation Section will meet in Vancouver, B. C., April 26-28, with headquarters at the Vancouver Hotel; the Business Development Section will convene in Butte, May 15-17, at the Hotel Finlen.

The program of the engineering meeting is shaping up through John Bankus, Portland General Electric Co., section chairman. Nine committees and subcommittees each will have an allotted time on the program to present subjects for discussion. More time is being set up for general discussion from the floor this year through splitting two of the sessions into parallel groups.

The committees to report are: code, utilization, power production, purchasing, transmission and distribution, electrical equipment, meters and services, electronics and electric house heating research.

Tom Ingledow, vice-president of B. C. Electric Co., is general chairman of arrangements.

A change in the plan of the program of the Business Development Section in Butte will provide more general sessions for nationally known speakers who have been invited to be on the program, according to Earl A. Olson, Idaho Power Co., section chairman. The bureaus and committees which heretofore have met in their own separate sessions on two half-days, will have only the first afternoon for such meetings this year. These are commercial and industrial bureau, electric home bureau, rural and farm bureau, adequate wiring bureau, manufacturer-wholesaler-dealer-contractor bureau, advertising and publicity committee and rate research committee.

D. J. McGonigle, Montana Power Co., general chairman of arrangements, is providing an unusually interesting round of events for evenings and on the afternoon of May 17, which is set aside for trips. On this afternoon, the delegates will be offered their choice of a conducted tour over the Copper Keys Trail, a trip underground in one of Butte's most famous copper mines, a tour through the Washoe smelter of the Anaconda Copper Mining Co. at Anaconda, or a visit to Lewis and Clark Caverns, 45 miles east of Butte.

NECA

On his return from the meeting of the administrative committee at Miami, J. D. O'Connor, vice-president, District 6, National Electrical Contractors Assn., met with the chapters in the Pacific Northwest the first of March. A meeting was held with the Oregon Chapter at Portland on March 1, the Puget Sound Chapter in Seattle, March 2, and the Inland Empire or Spokane Chapter March 3. E. R. Cornish, director, Pacific Coast office, accompanied O'Connor. O'Connor reviewed activities and actions taken at the administrative meeting and then answered questions as to bid depository operation from personal experience in the Sacramento Chapter.

A meeting was likewise held with the Northwest Line Constructors Chapter, and Paul Heydon of Spokane resigned as its manager. The directors then appointed Larry Rodgers of the Portland Chapter as manager of the Line Constructors Chapter, and the office of the chapter is to be moved to Portland.

Cornish has announced also that Matt Sherwood joins the NECA as field representative in District 6, assisting Cornish, on March 20. Sherwood has been an estimator for Ets-Hokin & Galvan Co. at Oakland and some other electrical firms during the past several years. He was president of the Electrical Estimators Assn. of Oakland last year. E. R. Cornish went to Washington, D. C., for the conference on new phases of activity late in the month. He announced that a new agreement had been closed at Tacoma with no increase in pay and that the San Diego Chapter has renewed its contract with the same rate of pay for the next two years. Many chapters, according to Cornish, are interested in bid depository operation, among them the Los Angeles Chapter.

On the NECA personnel and business training program, Cornish is writing portions of the estimating section out of his experience in conducting a correspondence course in the West. The national program is designed to be flexible so that it can be handled either on an individual correspondence basis or in chapter classes through the field service and the chapters. Heading the national committee is Frank Groleau as secretary of the committee, of which Robert McChesney is chairman. Two Western members on the committee are Ed Buttner, Oakland, and Simon Halle of Colorado Springs.

A surprise and an honor was given to Seth Cohn, Atlas Electric Co. of San Mateo, one of the pioneer NECA members and association workers on the San Francisco peninsula, at the annual banquet and installation of new officers of the Peninsula Electrical Contractors Division of the San Francisco Chapter. The party occurred on the golden wedding anniversary of Mr. and Mrs. Cohn. William J. Varley, manager, and Mrs. Clelia Maoli, secretary, had made arrangements to turn the party into a golden wedding celebration for the pair. Louis Rolla, Coast Electric Co., was re-elected president and installed for a second term. W. T. Kennedy of Kennedy Electric Co. was named vice-president. Joe Dingman was re-elected treasurer. Directors re-elected were Seth Cohn, who is also chairman of the apprenticeship training committee; Emil Meuller and C. Cocconi. More than 150 members of the industry and their wives made it a gala event.

Annual banquet to honor officers of Peninsula Electrical Contractors Assn. was turned into a surprise golden wedding celebration for Mr. and Mrs. Seth Cohn, Atlas Electric Co. Louis Rolla, Coast Electric Co., re-elected president, congratulates Cohn, charter member, while Mrs. Kennedy and Mrs. Rolla pin bouquets on the couple. W. T. Kennedy is vice-president of this association

Credit problems of the contractor were reviewed for the Alameda-Contra Costa County branches of the Northern California Chapter at an unusual meeting last month at San Leandro. Tony Seraphin, chairman of the southern Alameda County group, presided.

Bruce Winship, secretary-treasurer, Scott-Buttner Electric Co., Oakland, and an experienced man in credit, spoke on the contractors' credit problems, particularly the credit he extends to his customers. He stressed the importance of very prompt collections and immediate follow-up in order to get his own money in and keep his own credit good.

Kenneth C. Bugbee, manager of Wholesalers Credit Assn., Oakland, also gave some practical realities regarding the three kinds of accounts a contractor has: (1) retailers, (2) industrials and (3) building contractors. He stressed particularly the necessity of having contract forms and having all work signed for in writing, citing numerous experiences of disputes over work done which was not authorized by a signature. He urged the use of the wholesale houses and the association to get credit information on customers and warned particularly against extending credit to dry cleaners, beauty parlors, bars and newly formed enterprises. As for relations with contractor-builders, he spoke of watching the lien rights and working with the architect.

A. F. Rahlves, Contractors State License Board of Oakland, an old-timer in the industry, likewise talked about lien laws and the use of the contractors' license law to get collections from general contractors. He told of the number of new licenses being issued each month and pointed to this as a great danger to the stability of the industry. In Alameda County alone there had been 220 licenses since the first of the year, 18 applications in January for electrical and ten in February. Out of 1,433 applications last year, 710 had passed. He reminded contractors that they are not bankers and that they should not be expected to finance the general contractors, and therefore must get their money when it is due.

Ernest G. Kramm, manager of the chapter, announced an electrical estimating series of classes, using the NECA Manual of Labor Units and conducted by John Names of the Oakland Electrical Estimators Assn. at the Laney Trade and Technical Institute in Oakland.

Contractors

The Victoria, B. C., Electrical Assn., a contractors group, draws almost 100% attendance, according to S. E. Jarvis, its secretary. At the last meeting R. D. Hodges, industrial control designer, Canadian General Electric Co., told of modern developments in industrial electrical control, particularly amplidyne and electronic controls.

Idaho State Electrical Contractors Assn. is working very closely with the Idaho Chapter of the Northwestern Section, IAEI, and many of the meetings are what might be called joint meetings of the two groups. About 80% of the time, according to J. Carl Baldridge, secretary, is devoted to promotion of good wiring based on the National Electrical Code and on the adequacy of electrical installation. Outside speakers are also used and contractors, journeymen, power company representatives, wiring supply representatives all participate. Talks have been had on estimating, good bookkeeping and relative subjects. When a new product is put on the market, a representative is asked to discuss it. The necessity of selling on the part of contractors and how journeymen can make themselves more valuable by doing a little selling is also stressed. Meetings have been held in Nampa, Boise, Weiser and Twin Falls and in April the Idaho Chapter, IAEI, will hold a meeting April 17 and 18 in Boise to which all will be invited. The Idaho Chapter, IAEI, has formed divisions in four locations and in the next two months will hold meetings. Attempts will be made to organize more divisions in the larger towns, probably Lewiston, Pocatello and Idaho Falls. Subjects brought to these meetings will interest both contractors and inspectors and aim toward elevating the electrical industry to a higher standard and telling the general public the importance of modern electrical living.

IEA

Carlos W. Stone recently resigned as manager of the Intermountain Electrical Assn., Salt Lake City. He is to

become a distributor for Deepfreeze products in the Salt Lake and Intermountain area. No successor has yet been announced. The IEA recently announced a group insurance program by which employees of members and their dependents could be covered by quite a comprehensive group insurance program offered by North American Life & Casualty Co.

Governor J. Bracken Lee was scheduled as principal speaker at the March 28 membership meeting of the Intermountain Electrical Assn.

IES

Northern California Section, IES, heard some of the engineering facts of life as regards specifications and what they mean to an engineer from Harold Gerber, senior electrical engineer, A. A. Coddington Co., and for many years an electrical inspector. Gerber made plain some of the physical problems the engineer encounters in laying out lighting and the reasons for specific naming of products or types to suit certain conditions. Under such circumstances very often there are no "equals." He likewise stressed the importance of voltage drop in circuit arrangement to provide adequate illumination. The use of low-voltage control for switching circuits, he said, is being made mandatory because of the extensive use of glass partitions and lack of space for switch loops.

"Lighting in the Canning Industry," with recommended standards for various types of departmental lighting, has just been completed by a Western committee of the Illuminating Engineering Society and published by the society. Carl O. Martin, Benjamin Electric Mfg. Co., San Francisco, was chairman of the Western committee which included L. H. Brown, S. H. Hazelton Jr., K. M. Noble, Robert S. Prussia, Robert Fallon and H. K. Wilder of the canning industry. The committee recommendations come as a result of more than three years of work. The committee was assisted by a research fellowship at Stanford University sponsored by the National Canners' Assn. which, likewise, was interested in this fundamental approach to the problem of lighting various work processes in the canning industry. The booklet has 36 pages, is well illustrated and has a number of tables. It covers not only general lighting but illumination for color grading, inspection and the recommendations for the various critical seeing tasks in specific types of canning. Copies are available from the society, 51 Madison Ave., New York 10, N. Y., at 50c each. Two other similar studies, one for wool mills and another for machining small metal parts, are also announced by the society.

Electrical Estimators

Herb Bowen was elected president of the Electrical Estimators Assn. at Oakland, Calif., and installed March 2. He succeeds Matt Sherwood who has served for the past year. Other officers elected are Steve Lindheim, vice-president; Don Heim, secretary; Daryl Davis, treasurer; and on the executive board Matt Sherwood, Jerry Gizdick, Gordon McMahon, Ed McCarthy, J. Names and Roy Grimes.

Changing officers at Electrical Estimators Assn. of Oakland when bosses were guests. At head table, John Names, Frank Alder, past treasurer, Herb Bowen, the new president, Matt Sherwood, past president, and Don Heim, secretary

RMEL

Electric meter manufacturer representatives demonstrated the latest improvements for electric meters and other testing instruments at an electric meter school, March 20-24 in Denver, put on by the Rocky Mountain Electrical League.

The league's electrical dealers division met jointly with the IES on March 21 to hear Donald P. Caverly, director of commercial engineering, Sylvania Electric Products Inc., describe new developments in office and industry lighting. Charles H. Goddard, president of IES and manager of utility sales for Sylvania, was also scheduled as a guest speaker.

Inspectors

Dates for the annual meeting of the Southwestern Section, International Association of Electrical Inspectors, have been advanced to Sept. 18, 19 and 20 instead of the latter part of the week. This was done to permit the visitors from the East to reach San Jose from Seattle, where the Northwestern Section meets Sept. 11, 12, 13. The Southwestern Section meeting will be at the St. Clair Hotel, San Jose, presided over by Robert Maxwell, San Jose city electrical inspector, president of the section.

Central California Chapter re-elected George W. Hayden, of PG and E, as its chairman and L. B. Sterling, Fresno city inspector, at its last meeting. G. W. Nelson, of Kingsburg, was chosen vice-chairman. Peter Dunbar, Von Fereshetian and Archie Henderson were named directors.

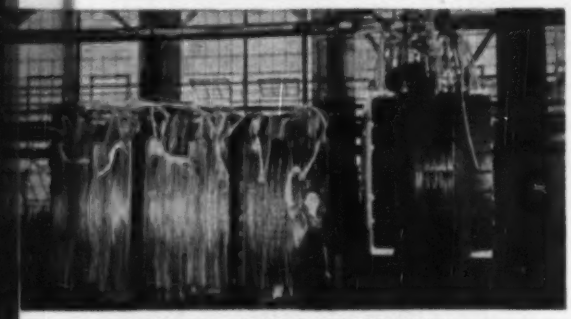
Electric Clubs

Ray W. Turnbull, commercial vice-president, General Electric Co., San Francisco, was inaugurated as president of the San Francisco Electric Club with customary burlesque ceremonies March 6. As "Dr. Albert Einstein," William A. Cyr, ELECTRICAL WEST, computed the mathematical formula which decided Turnbull as the president. He was assisted by Joe Robinson. Eugene Whitworth, PG and E, as a Mexican, took Past President D. D. Smalley back to the farm. Other officers elected to the San Francisco club were J. R. Lazarus, secretary-treasurer; directors Robert Neal, Westinghouse vice-president; Roy Dreiman, Coast Counties Gas & Electric Co.; Charles Yost, PG and E; and Smalley, the past president. Charles Huyck, Graybar, was honored with a gift for his excellent weekly newscasts and presentation of the merits of the incoming presidents.

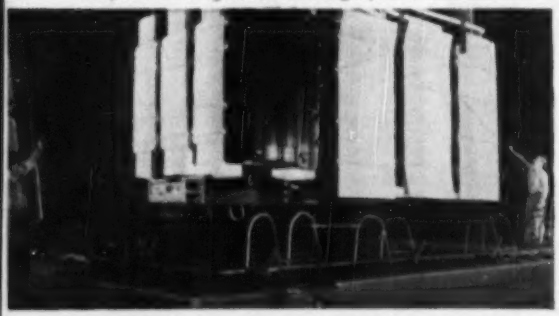
1. GOING OVER PLANS, engineer J. R. Mann discusses terminal board design with designers Kotz and Reinemann. Detailed engineering included corona-free design for every part of transformer.

2. ACTUAL CONSTRUCTION STARTS with fabrication of windings. Here, workman tapes inside connection on pair of 78" coils. Circular design is used to reduce strain under short circuit conditions.

NATION'S LARGEST TRANSFORMER TIES IN TRI-STATE POWER



3. LOWERING SERIES TRANSFORMER into position. Shell type construction permitted impedance matching of multiple windings without sacrifice of insulation strength; at same time, freed windings from blanketing layers of insulation.



4. LASTING DIELECTRIC STRENGTH is gained by thorough vacuum drying. Eight day treatment in chamber above removed over 2000 lbs. of water from core and coil assembly!

201 Ton Giant Interconnects Three Major Utilities in Arkansas, Missouri and Kansas

LINKING THREE MAJOR POWER SYSTEMS — all at different voltage levels — is the assignment behind this record breaking transformer.

Purpose of the tie-in is to increase flexibility and economy of operation for the systems involved. These systems are: Empire District Electric (purchaser), Arkansas Power and Light, and Kansas Gas and Electric.

To build a transformer to meet the requirements of this job called for a certain amount of special engineering. Multiple main windings, for example, had to be designed to furnish up to 40,000 kva at voltages of 161, 132, 69 and 13.2 kv. On top of this, it was necessary to incorporate a 132 kv, 4300 kva series transformer for load ratio control.

But basically it was a matter of applying Allis-Chalmers wide background of existing design knowledge to a new and larger problem.

Completion of this record size transformer is another example of Allis-Chalmers' ability to engineer power transformers in *any* rating . . . to fit *any* system needs.

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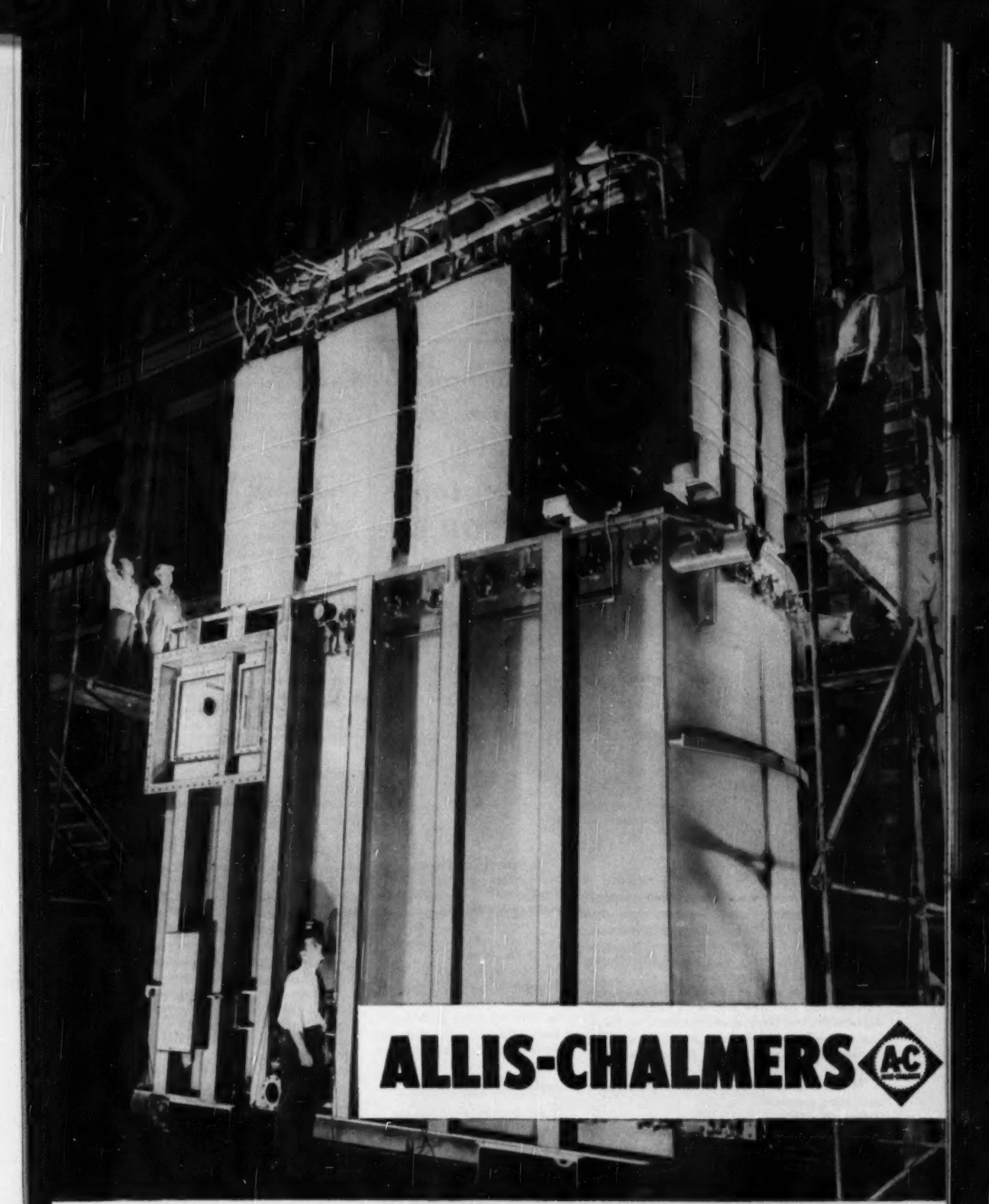

ALLIS-CHALMERS

5. IT'S A SNUG FIT as 86 ton core and coil assembly is lowered into tank. Coils are still warm from vacuum drying process at this stage. Before they have a chance to cool, "dry" (moisture-free) oil will be added to assure lasting performance during many years of operation. Finally, transformer will receive electrical and pressure tests; will then be shipped on special car to permanent site.

Everywhere you hear "#1100 is a *Find* for windings!"

That's why hundreds of new users have switched to

Irvington #1100

clear, stable insulating varnish

One trial did it in the many shops now standardizing on Irvington #1100. Their endorsements boil down to: "We like its stability in dip tank and in storage . . . its clear color and low cost. We use this one varnish on practically all our windings, and cut inventories."

They like its oil and chemical resistance, too . . . the way this new insulating varnish sinks into remote coil layers and grips the wire, forming a solidly bonded mass. Internal-curing, it hardens throughout after a short bake, to a durable, oil-proof coating. The solvent is V. M. & P. naphtha, which does not attack other insulating materials.

Irvington #1100, backed by heavy research, excels on all windings except those operating at highest speeds. One varnish does all, and saves you real money, too. Write for a sample.

Specifications:

Dry Dielectric	2000 VPM
Moisture Resistance	Good
Oil Resistance	Excellent
Acid Resistance	Excellent
Alkali Resistance	Good
Heat Resistance	Very Good
Penetration	Excellent
Baume	25° @ 30 deg. C.
Sp. Gr.	0.903 @ 30 deg. C.
Sp. Gr. for use	Optional
Solvent	V. M. & P. Naphtha

Look to Irvington

for Continued Leadership in Insulation

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Irvington 11, New Jersey

Represented in the Western States by
C. D. La Moree, Los Angeles, Berkeley, Seattle; Electric Motor Supply Co., Denver

PCEA PANORAMA

Edited by A. X. Schilling

Wal, pards, reckon as how we're all a-goin' a heap Western, this year, along with our faxenfiggers, come convention time. May even be some old-time Western chow, and some plain and fancy Western square dancing.

This year's annual convention will come to order in Reno, Nev., on Wednesday morning, May 31, with a general session scheduled for that morning and other general sessions for the following two mornings. Luncheons, complete with the excellent speakers we have learned to expect, will be held on Wednesday and Thursday; parallel sessions are planned for those two afternoons.

On Friday, June 2, the annual business meeting will conclude the morning's session, and the afternoon will be devoted to the annual golf tournament and to other diversions according to the fancies of individual delegates.

Contrary to the custom of previous years, the annual banquet and dance will not be held on the final day of this year's convention. Instead, it is being planned for Thursday evening, and arrangements are being made to capitalize Reno's Western atmosphere by conducting a chuck-wagon barbecue and square dance that evening in place of the conventional dinner and dance.

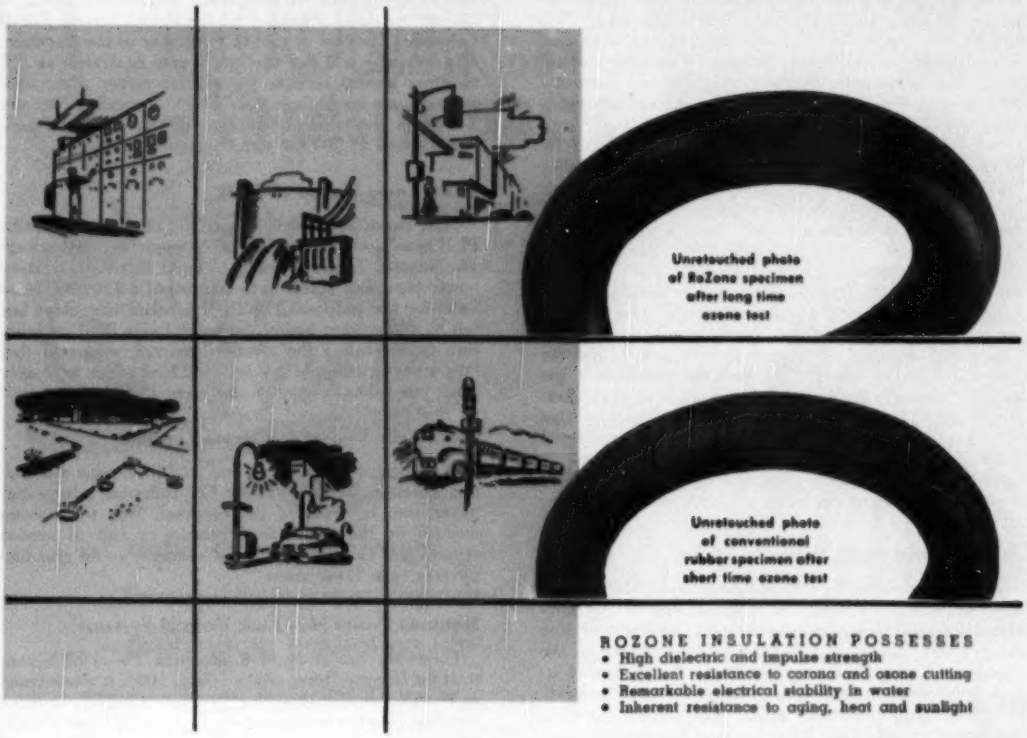
This will be the first time in PCEA history that the annual convention has been held outside of California. In keeping with the locale, the theme of this year's gathering will be "Pioneers of 1950."

General chairman of this year's convention will be Frank A. Tracy, president of the Sierra Pacific Power Co., Reno. Assistant general chairman will be A. L. Pierce, of the same company. Heading the various activities will be: Walter Herz, stage manager; G. C. Tenney, program committee chairman; A. E. Holloway, attendance committee chairman; N. R. Sutherland, attendance committee vice-chairman; W. E. Nagel, registration committee chairman; A. D. Bragg, reception committee chairman; R. D. Moody, banquet and entertainment committee chairman; A. D. Curtis, transportation committee chairman, and A. L. Laws, vice-chairman; R. W. Jackson, publicity committee chairman; Emmett Saviers, golf committee chairman; John Kitchen, hotel committee chairman; Milo Tally, ladies' entertainment committee chairman; F. E. Bodine, ushers committee chairman, and Marshall Lasher, cocktail party committee chairman.

Rome RoZone

THE SUPERIOR OZONE-RESISTANT INSULATION

adds years to cable life...


Unretouched photo of RoZone specimen after long time ozone test
Unretouched photo of conventional rubber specimen after short time ozone test

ROZONE INSULATION POSSESSES

- High dielectric and impulse strength
- Excellent resistance to corona and ozone cutting
- Remarkable electrical stability in water
- Inherent resistance to aging, heat and sunlight

The photos above tell their own story. At the top is RoZone insulation after being subjected to an ozone atmosphere for a period well in excess of specification requirements. Note that there is no deterioration of compound... no surface checking. Below is conventional rubber insulation after a much shorter ozone test. These unretouched photos demonstrate clearly the superiority of RoZone under conditions of ozone cutting when higher voltages are involved... all of which means longer service life and greater dependability.

Specifying RoZone pays off on many installations. For example, high voltage power circuits... station or supervisory control signal cables... street lighting cables... airport lighting and control cables as well as general purpose wiring where high quality and long life is paramount.

Write for specification RO-4 today and see why leading utilities, industrials and railroads are specifying RoZone.

It Costs Less to Buy the Best...
Buy Rome RoZone

ROME CABLE
Corporation
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From Bar to Finished Wire

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THE MONTH IN BRIEF

Would Exclude Private Plants

Appearing in person at oral arguments in Washington on Kings River (Calif.) power development rights, Interior Secretary Oscar Chapman last month asked FPC to deny private interests any right to build additional hydro plants on that stream. Interior is seeking reversal of a commission order giving Pacific Gas and Electric a 50-year license and Fresno Irrigation District a preliminary permit for proposed development of the water. Grounds are that, since the Kings River has been included in the bureau's comprehensive Central Valley Basin plan, FPC has no authority to grant licenses there to private companies. Secretary Chapman declared that final decision in the case would "have a vital effect in continuing or reversing a national public power policy in which this government is committed." He said this policy recognizes that "large-scale public power development is for the common good." The commission's order allowing PG and E a license "strikes at the very heart of this policy," he declared. Attorneys for PG and E and the irrigation district brought out that the government has no prior claim to the water; that proposed private plants would not disrupt the bureau's comprehensive plan; that bureau plans would cost more than can be recovered from power sales; that Kings River water resources would remain idle awaiting future development by USBR, if private plants are not built.

Jurisdictional Fight Factor in Strike

Behind the scenes in the quickie strike at the Department of Water & Power, Los Angeles, was the jurisdictional fight going on between AF of L unions over line construction and other utility work. Low bidder on the erection of a transmission line from Owens Gorge to Los Angeles was a general contractor. Electrical contractors had not bid because IBEW rules require them to use higher priced IBEW labor for steel erection and footings. Generals use laborers and steel erectors. In order to save the work for IBEW, the business manager called a quickie strike of unionized department employees, demanding that all work on the line be done by department employees. This would have cost the department $200,000 more. Finally face was saved by board agreements to erection of towers, footings, etc., by employees and a contract to an electrical contractor for wire stringing only. An Imperial Valley contractor, Joe Bush, will string the wire and criticism over contract letting will be stilled.

Rates Raised to Cover Storm Damage

Commissioners of the Clark County (Wash.) PUD have adopted new rate schedules providing a general increase averaging 7.06%. Increased revenues will be used to retire $500,000 of short-term bonds issued to repair storm damage (EWEST, March, p. 116.).

Rehearing on Wheeling Turned Down

California PUC has refused a federal government request for rehearing on dismissal of its case to compel PG and E to wheel power to federal agencies in California.

Taxpayers Okay Franchise, 26 to 1

Taxpayers of Monte Vista, Colo., last month gave overwhelming approval to a referred ordinance granting a 20-year franchise extension to the Public Service Co. of Colorado. The vote was 26 to 1 in favor of the franchise. The company will pay the city a sum equivalent to 2% of gross annual receipts for electric power sales, total payment not to be less than $3,500 annually. The city will pay a minimum of $4,000 a year for street and park lighting and $1,500 for water pumping power.

Town Loses Round to PUD

First round in its move to pull out of the Pend Oreille PUD was lost by the town of Newport in northeastern Washington. The town wants to build its own competing power plant and voters have authorized a $200,000 bond issue for the purpose. The PUD blocked city plans last fall by filing court action. Superior Judge W. Lon Johnson, in overruling the town's demurrer, suggested that "there is a question of law involved here which is of very great interest to every city and every PUD in the state."

Town Sells System to Private Company

The town of Wales, Utah, has sold its electric distribution system to Telluride Power Co., following a large taxpayer vote in favor of the proposal. Sale was recommended by the town board because of cost of needed repairs and fact that the power company could give better service at lower rates.

Montana Power May Link Federal Systems

Following execution of a Montana Power-BPA contract for Hungry Horse power (see p. 100), it was learned in Washington that the private company is likely to serve as a link between two huge federal power systems, Bonneville and the Missouri River Basin. Bureau of Reclamation, which has the responsibility for marketing Missouri Basin power, is negotiating a wheeling and power sale agreement with the company. Under the proposal, the Montana company would wheel Fort Peck power to preference customers in its territory and purchase secondary power from the federal system. One snag in the negotiations is said to be the company's reluctance to accept the one mill per kwh. wheeling fee offered by USBR. If it enters into the contract, the company would link Missouri Basin power from the east with Bonneville power from Hungry Horse on the west.

Power Company Rate Increase Approved

A 6% increase in electrical rates, asked last year by Pacific Gas and Electric Co., was granted last month by the California Public Utilities Commission. The company estimated that the rate increase, effective April 15, will add $8,766,000 annually to revenues. The commission called the request fully justified, pointing out that none of the intervening parties challenged the need for new revenue, only the proposed spread. The increase will place rate of return at 5.01%.

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... prolonging insulation life

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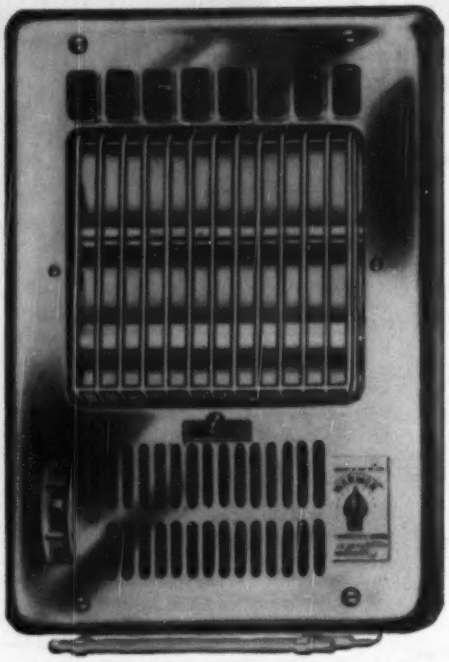

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THIS MONTH'S NEWS

Montana Company Will Take Hungry Horse Power

Approval by Secretary of the Interior Chapman of a contract between Bonneville Power Administration and the Montana Power Co. for company purchase of up to 50,000 kw. of Hungry Horse power will permit wholesale power deliveries to co-ops in the Montana area west of the Continental Divide at about 3½ mills per kwh. and to other utilities and industries at a similar cost.

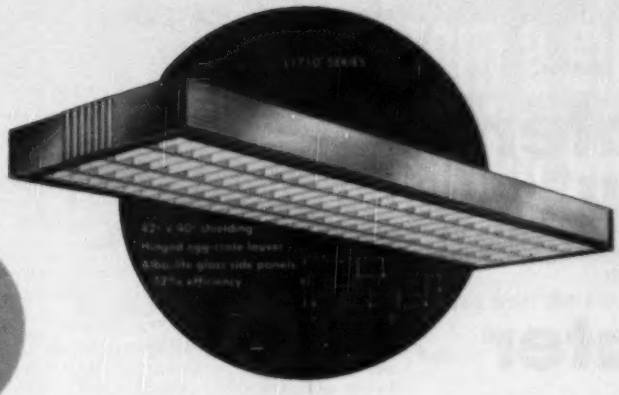
The contract, which provides a basic $17.50 a kilowatt year wholesale rate, was executed in Portland March 18 by BPA Administrator Paul J. Raver and F. W. Bird, president of the Montana company. It is the first contract to be entered into by Bonneville with a major power company for a full term of five years.

Initial delivery will be 25,000 kw. in the fall of 1952, with the amount increasing as power production grows at Hungry Horse until the contract demand is met.

Under terms of the agreement, connection between the Bonneville system and the Montana company's lines will be made at Anaconda, Mont. Preliminary surveys are under way for rights-of-way on Bonneville's Spokane-Hot Springs, Hot Springs-Hungry Horse and Hot Springs-Anaconda 230,000-volt transmission lines, tying Montana into the federal grid. Orders are being placed for steel tower, conductor and substation facilities. Clearing on the rights-of-way for the Spokane-Hot Springs section is expected to start in May, and on the Montana lines early in 1951.

The contract provides that the Montana company shall deliver power over its system to four electric consumer cooperatives for the Bonneville account. These are the Missoula Electric Cooperative Inc.; Ravalli Electric Cooperative; Northern Lights Inc., and the recently organized Lincoln Electric Cooperative. Northern Lights is the new name of the former North Idaho Rural Rehabilitation Electric Assn.

Pending completion of the Hungry Horse project, the 2,000 customers of the three cooperatives in western Montana will receive Columbia River power on an exchange basis. These are the Missoula and Ravalli groups and the Thompson Falls division of Northern Lights.



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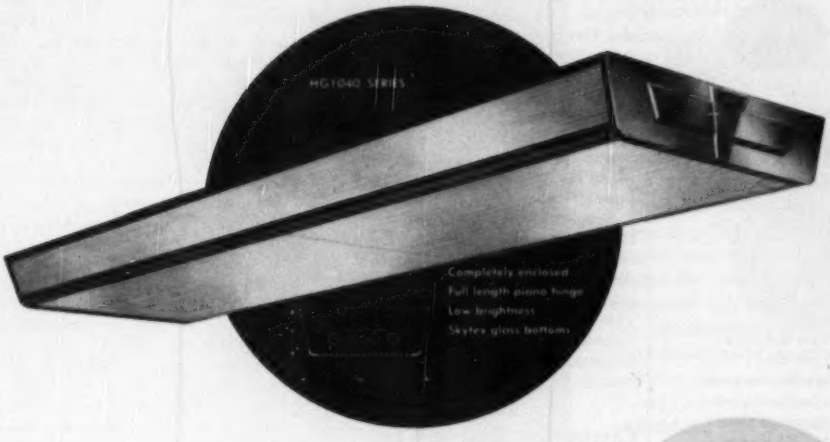
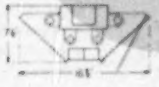


over these new designs for better lighting



Simplicity of line and detail, combined with high light output and low surface brightness, are the primary features of these new SUNBEAM fixtures. Designed to meet the higher standards of contemporary architecture, these units employ hinged shielding elements that allow easy lamp removal and maintenance. Specially constructed mounting devices facilitate installation. These units are available in 2, 3, and 4-lamp types in 48" single and bi-pin lamps and in 200, 300 and 430MA slimline. For further information on these units, please write...

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BIDS OPENED FOR SHASTA TRANSMISSION LINE

Bids were to be opened March 29 for construction of four towers for the Shasta - Tracy 230-kv. transmission lines across the Sacramento and San Joaquin rivers near Rio Vista, Calif.

Two of the steel towers to be erected by the Bureau of Reclamation for the major Central Valley Project transmission crossing will be 437 ft. high and 80 ft. square at the base to support the 3,810-ft. span across the Sacramento River. The two towers for the narrower San Joaquin crossing will measure 337 ft. Towers of this height are necessary to provide a minimum river navigation clearance of 140 ft. above high-water elevation.

The CVP 437-ft. tower tops by 54 ft. the 383-ft. structure built by the Pacific Gas and Electric in 1948 for the Carquinez Strait over-water span near San Francisco. The Carquinez span, however, measures 4,805 ft.

The four CVP towers will be equipped with airway obstruction lighting, and painted with alternate bands of international orange and white to conform to requirements for aircraft obstruction marking.

Specifications are being prepared for two remaining portions of the West Side transmission lines—the 66-mile Artois-Madison section and the 26 miles between Rio Vista and Tracy. The West Side lines are slated for completion by July 1951, when initial integrated Central Valley Project operation is to begin.

Construction Contracts Let For Municipal Power System

Contracts totaling $177,000 for construction on a municipal power system have been awarded by the Springfield, Ore., city council.

Montgomery Electric Co., Portland, received the contract for installation of some 1,800 poles, together with primary and secondary wires and cross arms. Contracts for trucks and construction equipment went to A. B. Scarlett, Eugene, and Rotts & Schetky Inc., Portland.

Springfield city officials report that chances of the city purchasing facilities of the Mountain States Power Co. appear to be fading, although negotiations are still in progress.

● CONSTRUCTION contracts covering two projects in Lincoln County in western Oregon have been awarded by the Benton-Lincoln Electric Cooperative. Walton Brown Electric Co., Salem, received the contract for 64 miles of distribution lines on a bid of $159,578. Contract for construction of 17 miles of 69-kv. transmission lines and 25 miles of distribution tap lines went to the Del Monte Electric Co., Oakland, Calif., on a low bid of $171,519.

Contract Awarded by Army For McNary Generators

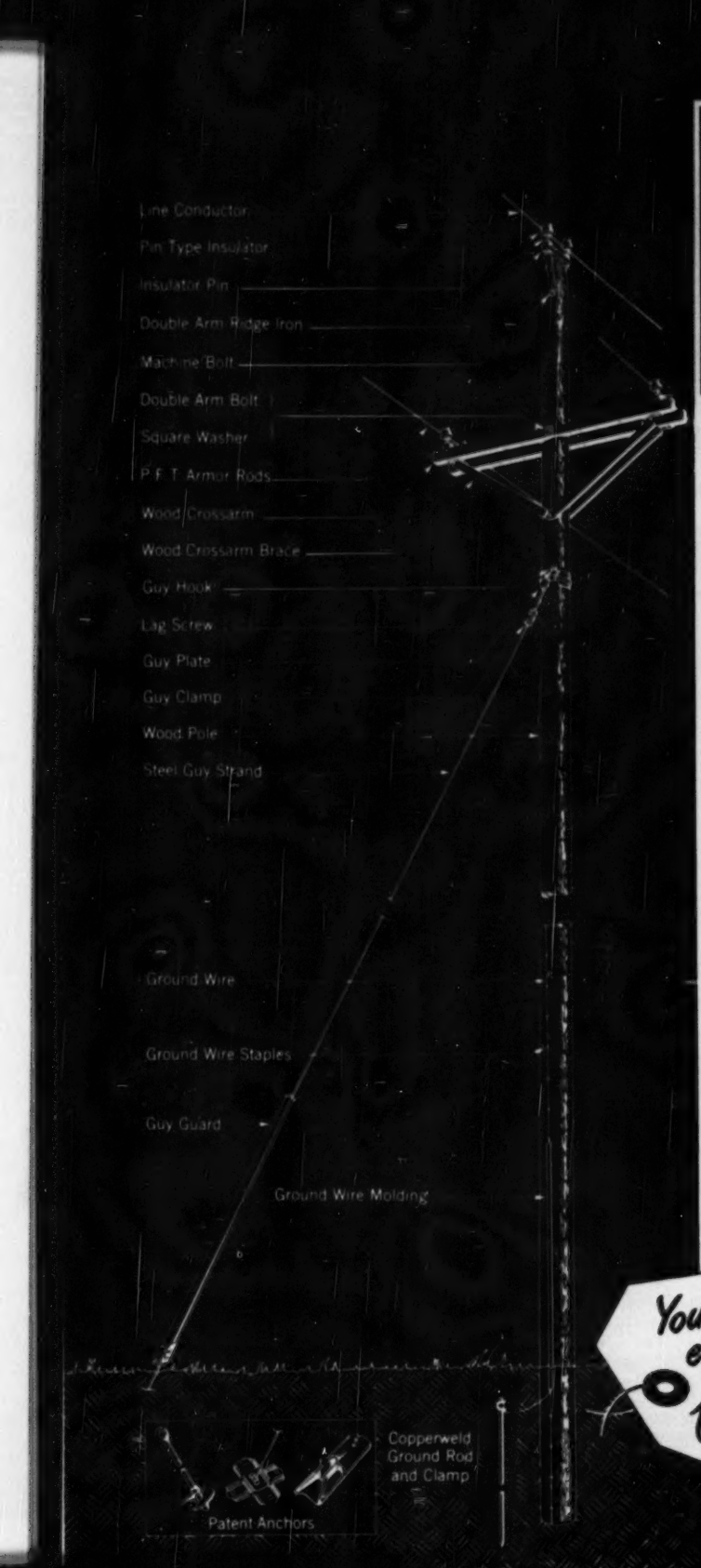
General Electric Co. submitted a low bid of $6,556,290 to the Corps of Engineers at Walla Walla, Wash., for design, manufacture and installation of four 73,684-kva. generators and appurtenances for the McNary Dam power house on the Columbia River. The same firm is furnishing the first four generators for the power house under a $7,302,674 contract.

The four generators covered by the new contract are to be delivered between July 1, 1954, and July 15, 1955, with the first to be ready for commercial operation by Dec. 1, 1954, and the last by Dec. 1, 1955. The first two under the first contract are to be ready for commercial use by Dec. 1, 1953.

● SEATTLE, Wash., Municipal Board of Public Works received a low bid of $1,424,300 from Peter Kiewit Sons' Co. of Seattle for excavation for the Ross power house and tunnels on City Light's Skagit project. The contract involves some 33,000 cu. yd. of all-class excavation in penstock and power tunnels, 60,000 cu.yd. of common excavation, and 77,000 cu.yd. of rock excavation for the power plant and yard. The power plant will be just below Ross Dam, completed last year at the head of the narrow Skagit Canyon.

● CENTRAL Arizona Light & Power Co. has sold $5,000,000 in first mortgage bonds to go toward the $15,000,000 needed within the next few years for its building program. The company has spent $27,000,000 on expansion during the past four years. The bonds were sold to Northwestern Mutual Life Insurance Co., twelfth insurance company to invest in the utility. They are 30-year, first mortgage bonds, bearing 2¾% interest.

● THE GRAYS HARBOR PUD of Aberdeen, Wash., was receiving bids until April 3 for the preparation by a "competent consulting engineer or engineering firm of an engineering survey and report of the electric public utility of the district." The report is to concern the PUD's "management of its business and the operations and maintenance of its property," according to Manager F. J. Robbins.



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TACOMA PLANS BIG EXPANSION PROGRAM FOR CITY LIGHT

A $12,000,000 expansion and improvement program for Tacoma City Light has been announced at Tacoma, Wash., by C. A. Erdahl, public utilities commissioner. It will be paid for through six series of $2,000,000 bond issues, to be retired through earnings of the system. The first series already has been approved by the city council.

First project under the program will be the purchase and installation of a third turbine and generator unit at the Cushman Plant No. 2. Another project will call for construction of a substation south of the city to provide more direct connections with Bonneville Power Administration lines.

Also included in the program will be transmission lines, warehouses, shops and offices.

Erdahl, in announcing the program, pointed out that the system earned more than $6,000,000 last year while maintaining the lowest rates in the United States.

Appropriation Asked for Seattle City Light

Announcing immediate expansion plans, Seattle City Light Superintendent E. R. Hoffman has asked the city council for an appropriation of $1,526,000. The money would be drawn from the lighting department's construction fund and spent for work outlined in an ordinance approved sometime ago by the council.

The major outlay proposed is $700,000 for equipment at City Light's new North substation, and $657,000 for machinery to be installed at small unit substations throughout the city. Other projected expenditures listed were: oil treatment plant at the South substation, $98,000; line crew's headquarters at main warehouse at South substation, $45,000, and miscellaneous equipment for the Central or downtown substation, $8,000.

B. C. Electric Modernizes Lake Buntzen Plant

Modernization of the No. 1 plant of the B. C. Electric Co., at Lake Buntzen, B. C., has been announced by A. E. Grauer, president of the company. Work will start in May and will cost $3,500,000. The project will be completed by the end of 1951.

A $500,000 contract for the 72,000-hp. turbine, which will nearly triple the plant's existing energy output, has been let to Vancouver Engineering Works.

Outlining some details of the Buntzen project, Tom Ingledow, BCE vice-president and chief engineer, said the new 72,000-hp. unit will replace seven existing generating units, two of which have been pumping energy into Vancouver since 1903.

A vertical reaction-type turbine, the new machine will be 35 ft. in diameter, with a speed of 240 r.p.m. One of the giant valves required will measure more than 11.5 ft. in width.

Canadian Westinghouse Co. has been given an order for the generator, which will cost $650,000. Canadian General Electric has the contract for a $90,000, 66-kv. transformer.

First-Stage Construction Bids Called for Chief Joseph

Bids for first-stage construction of the Chief Joseph Dam on the Columbia River in eastern Washington have been called by the Corps of Engineers for opening May 2 at Seattle.

Completion of the work, which involves excavation and cofferdam construction for the $234,000,000 project, is proposed for April 1, 1951.

The power house is to be completed and the first four generating units installed in 1956. Altogether there will be 20 3-phase, 60-cycle, 13,800-volt generators with a combined output of 1,280,000 kw.

A $6,220,300 contract for ten 100,000-hp. hydraulic turbines to be installed in the power house has been awarded to the Newport News Shipbuilding & Drydock Co. of Newport News, Va.

● ELLENSBURG, Wash., has taken delivery of a 500-kw. diesel electric generating plant to be installed in the municipal hydroelectric plant. The $30,000 Cooper-Bessemer diesel will be used to supplement Ellensburg power demands. By cutting down the peaks in the city demand for Bonneville power, the city hopes to make the unit pay for itself by reducing the demand charge. The unit also will be able to supply power during times when other sources fail.

● ON MARCH 17 Seattle's Alaskan Way (from the foot of Broad street to Yesler Way) became what is claimed to be best-lighted stretch of waterfront in the entire world. On that date the new mercury vapor lights were turned on. The job was completed in three months at a cost of $40,000. Holert Electric Service of Seattle made the installation.

CENTRAL ARIZONA COMPANY EXPANDS ITS HOLDINGS

With purchase of generating plants at Flagstaff and McNary, Central Arizona Light and Power Co. has expanded its northern Arizona holdings.

The plants were obtained from Southwest Lumber Mills Inc., for $1,250,000. Both plants use sawmill waste as fuel and were built and operated by the lumber firm in conjunction with its sawmills.

In announcing the transaction, Henry Sargent, Calapco president, said the purchase was part of the company's $43,000,000 improvement and construction program which is more than two-thirds completed.

In four years, Calapco has spent $27,000,000 in new construction and improvements, and another $15,000,000 is earmarked for work in the next two years.

Calapco will spend more than $200,000 in improving the Flagstaff and McNary operations. The Flagstaff unit had been selling surplus power to Northern Arizona Light and Power, subsidiary recently added to Calapco's power network.

USBR Awards Contracts for Hungry Horse Switchyard

Contracts totaling $181,006 covering electrical equipment for the Hungry Horse switchyard have been awarded by the Bureau of Reclamation.

Pacific Electric Mfg. Corp., San Francisco, will supply one 115-kv. and two 230/196-kv. circuit breakers on a bid of $145,620, f.o.b. Coram, Mont.

Six 230,000-volt lightning arresters will be supplied by Westinghouse Electric Corp., Denver, at a total cost of $17,852, f.o.b., Coram. The Larkin Lectro Products Corp., Pine Bluff, Ark., will supply one 1,500-kva. transformer on a bid of $6,111 f.o.b. Coram; and the Schwager-Wood Corp., Portland, Ore., will furnish electrical switches on a bid of $5,110, f.o.b. Coram. Gough Industries Inc., Los Angeles, has received a $713.90 contract to supply four current transformers.

● PROCEEDS from the sale of $9,000,000 worth of 30-year first mortgage bonds by Pacific Power & Light Co. will be used to retire bank loans made for the company's construction program. The proposed sale, registered with the Securities and Exchange Commission, will be made through competitive bidding.

1 TO 42 CIRCUITS

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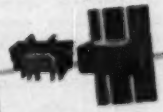

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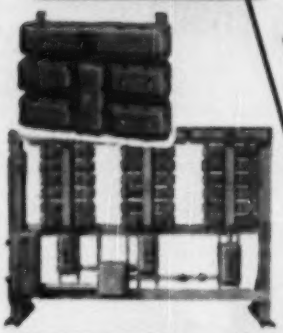

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SAN DIEGO G & E APPROVES SILVER GATE EXPANSION

The San Diego Gas & Electric Co. board of directors has approved purchase of another 50,000-kw. turbo-electric generator for the Silver Gate station in 1952, to cost about $8,000,000. At the same meeting the board approved the 1950 construction program of $12,000,000.

Securities and Exchange Commission approval is anticipated in time for the utility to sell 500,000 additional shares of $10 par value stock early in April on a negotiated basis, as recently approved by the State Public Utilities Commission. The sale is expected to net the company more than $6,000,000. The company was said to have a loan agreement with a syndicate of banks for an open credit up to $8,000,000 to finance its improvement program until outstanding indebtedness made it economical to sell equity shares for loan repayments. The proposed stock sale would retire outstanding bank loans of $4,800,000.

Principal items in the 1950 construction program are $4,000,000 for completion of electric generating unit No. 3 at Silver Gate; $1,622,000 for 15 substations; and $500,000 for rural district transmission lines.

● PUBLIC POWER proponents in the Klamath Falls, Ore., area have formed the Klamath Power Extension League with a view to organizing a drive for extension of Bonneville transmission lines from Maupin to Klamath Falls. The new organization has called on granges, labor and business to back the project. The league adopted a resolution declaring that power shortages and interruptions have "impaired and delayed normal business in the Klamath basin." Klamath Falls Chamber of Commerce directors recently voted to discourage the proposed extension.

● A SPECIAL election will be held at Burbank, Calif., on June 6 to determine whether the city public service department shall issue bonds, not to exceed $3,000,000, for another unit for its steam electric plant. Under the proposal, the bonds would be paid off from department earnings. The unit would be the fourth at the plant and would increase capacity to 70,000 kw.

● KLICKITAT COUNTY PUD of Goldendale, Wash., has received approval of the Rural Electrification Assn. for award of a $301,612 contract to the Huenergard Electric Co. of Portland, Ore., for construction of 211 miles of distribution line. Completion of the work is scheduled for next December.

WAGE INCREASES GRANTED BY WASHINGTON UTILITIES

A private power company and four PUDs in Washington state have granted wage increases to their employees, and another PUD has signed an agreement which continues present wage scales for another year.

The Puget Sound Power & Light Co. of Seattle granted a 5c hourly wage increase to 1,800 employees in 350 classifications. The Okanogan County PUD of Okanogan and the Franklin County PUD No. 1 of Pasco granted similar increases, bringing the pay of journeymen linemen to $2.18 an hour in Okanogan County and $2.23 in Franklin County. In Mason County, PUD No. 3 of Shelton upped wages 6c an hour, bringing the scale for linemen to $2.20.

All agreements are retroactive to Jan. 1 and were made with Local 77, International Brotherhood of Electrical Workers, AFL. All improve vacation schedules and other "fringe" benefits, such as reimbursement for wages lost through jury duty.

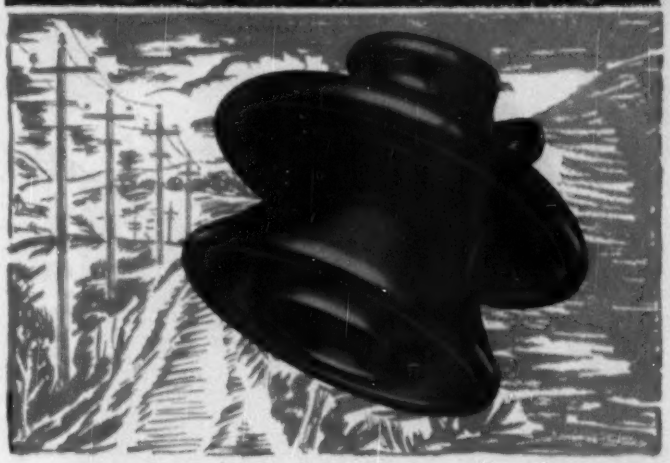
In Vancouver, Wash., the International Brotherhood of Electrical Workers has voted to accept a 5c-an-hour wage increase offered by Clark County PUD, thus averting a strike called for March 15. Under the new contract, the hourly wage is increased from $2.10 to $2.15, retroactive to Jan. 1. A no-strike, no-work-stoppage clause was rejected by the union.

Employees of the Wahkiakum County PUD get no increases but are brought under the state retirement plan. Journeymen linemen get $2.13 an hour in that county.

Other contracts are being negotiated with PUDs in Benton, Grays Harbor, Lewis, Grant and Pacific counties.

● O. L. (Tex) NORMAN, manager of the Salt River Valley Water Users Assn. at Phoenix, Ariz., since 1947, has resigned, effective June 1. The association last year split its power and irrigation operations into two divisions. Norman remained as head of water and irrigation. A new general manager for power was installed. Norman, in resigning, protested that the split had left him "titular head of the association without the duties or responsibilities normally assumed in such position." He said, "I do not want the commendation for the success, or condemnation for failure of our operations over which I do not have managerial control." During Norman's tenure as general manager the association instigated a vigorous reconstruction and improvement program to conserve water and improve electrical distribution.

RIGHT *for the JOB*... RIGHT ON THE JOB!



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MANAGEMENT SCHOOLS HELD FOR B. C. ELECTRIC STAFF

Management personnel of B. C. Electric Co. has been "going to school" recently. The school includes all officials and employees in administrative capacity and is covering the entire territory of the company in Victoria, Vancouver, and New Westminster, B. C., and the Fraser Valley.

"Students" for school include all persons engaged in a supervisory capacity with the company—from President Dal Grauer down—and "teachers" are L. B. Jack and his industrial relations department staff, under the direction of W. C. Mainwaring, vice-president and assistant to the president.

The course, or series of discussions, was started in Victoria in the first part of December, and is now continuing throughout the Mainland supervisory staff with the object of passing through the entire 400 comprising the senior employees, who are charged with acting for management in their daily duties of supervision.

Introduction of the discussion series was brought about by an appreciation by executive management that many of the supervisory staff were not being given the opportunity of taking an active part in the planning of a supervisor's work.

In preparation for the time when this opportunity might be provided, management many months ago authorized the circulation of an Employees' Attitude Survey. This survey was aimed at setting up the employees' opinions on what they considered to be weaknesses in the company's operation, and also gave them the opportunity of giving their opinions on supervision within the company.

This was followed with a second questionnaire, designed to cover certain sections of the supervisory personnel. In this survey they were given the opportunity of expressing their views on such topics as planning and organization, promotion, salary requirements, and so on.

Answers to the second survey were related wherever possible to the employees' questionnaire, thus giving an over-all company picture from the employee and management points of view.

Correlation of these answers provided the textbook which formed the basis for study in the discussion groups.

The discussion periods consist of three four-hour sessions, in which every question contained in the second questionnaire is read through and analyzed.

A feature of the series has been the

"bull sessions" in the final two hours, in which the discussion is thrown open to any and all phases of company operations.

Eventually a handbook will be prepared to provide for standardization and uniformity of the role which the supervisor plays in his job.

EEI Life Saving Medal Won by Edison Line Crew

Highest award in the electrical industry, the Edison Electric Institute Medal for Life Saving, was presented to a Southern California Edison Co. line crew March 2 for saving the life of Edward Fahnestock, telephone company lineman, after an accident in South Pasadena last July 16.

Foreman of the crew, W. J. Sayers, received the actual medal and certificate for life saving, while the nine other members of the crew received miniature medals as well as certificates. The presentations were made by H. W. Tice, Edison company vice-president, at the company's service offices in Pasadena.

The accident occurred when Fahnestock came in contact with, and was frozen to, an energized wire. Fellow telephone company linemen, Harry Barlow and Charles Combers, had freed him and were trying to revive him when the Edison company heavy crew arrived on the scene.

Sayers attempted to give on-the-spot instruction on the specialized pole top resuscitation to the telephone company men, while W. W. Giles, Edison lineman, climbed the pole and began the actual revival work. In a few minutes Fahnestock began to breathe normally, was lowered in a sling by Sayer's crew and rushed to Huntington Memorial Hospital.

Fahnestock was present at the ceremonies, as were several other members of his crew. This award, known as a "gang award," is unusual even in the industry. It is customary to cite only the man who actually performs the actual resuscitation work. In this case, however, the whole crew participated in saving Fahnestock's life and were equally commended. The men receiving the awards were, in addition to Sayers and Giles, C. A. Richardson, R. J. Josenhans, J. G. Frings, H. M. Dalbey, N. D. Yale, J. E. McNabb, R. S. Nickerl and E. H. Ahlgren.

Material in the medals awarded contained copper from the original underground feeders laid down in New York City by the late Thomas A. Edison. This copper was donated by the New York Edison Co. and was part of the first underground distribution system supplying electric light and power.

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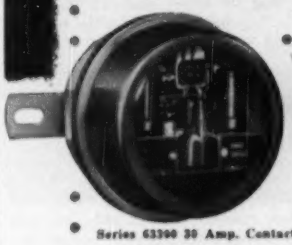

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Approved by street lighting engineers and maintenance men throughout the world, Fisher-Pierce units offer a simplified Photoelectric relay for control of multiple or series street lighting systems. Fisher-Pierce controls give you long tube life (20,000 hours or more), easy servicing, (plug-in chassis construction), *no resetting after power interruptions.* In other words, exceptionally *low maintenance costs.*

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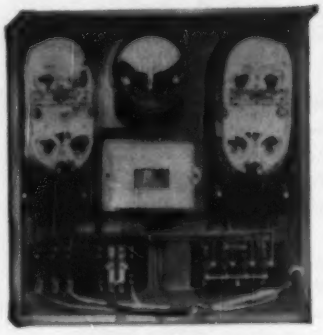

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KEES polyphase outdoor meter boxes feature knockouts for all probable hook-ups for polyphase meters, primary metering, time switches, and recording instruments. Front forms more than one-half the sides and bottom. Equipment can be reached from sides as well as from front. Weatherproof, waterproof front is hinged at top, easily detached. Latch may be sealed, and locked.

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WATER USERS STEP UP RAINMAKING PROGRAM

Prospects for the second lowest winter runoff in 36 years have spurred the Salt River Valley Water Users Assn. in central Arizona to step up reliance on artificial rainmaking. (E-West, March, p. 116).

The association has contracted with Precipitation Control Inc. to supply two planes throughout the summer to complement three ground installations.

The planes will fly radio-controlled range courses and seed clouds with silver iodide. The ground stations also will use silver iodide vapor generators.

At the same time, the association approved a contract to borrow $2,306,-881 from the Department of Interior. The loan is interest free and will be used to improve the irrigation distribution system and cut water losses.

Canals and laterals in certain sections will be lined, and where water loss is excessive, the laterals will be replaced with conduits.

Tacoma Utility Customers To Have Combined Bill

Customers of the Tacoma, Wash., municipal utilities—light, water and garbage collection—will get just one bill a month under a new system authorized by Mayor C. V. Fawcett.

Electric power and water have been billed together for the past year, under a process instituted by C. A. Erdahl, public utilities commissioner. The system has been so successful that it has been studied by representatives of the City of Seattle, Wash., the City of Sacramento, Calif., Portland General Electric Co., British Columbia Electric Co. and others, the mayor said .

Inclusion of the garbage collection charge with the light and water charges will make possible a total saving of $30,000 annually, Fawcett said.

The accounting section of the Northwest Public Power Assn. will inspect and study the installation at its May meeting in Tacoma. The system makes use of automatic machines and a punch card system.

● Benton County PUD of Prosser, Wash., has accepted the $343,700 bid of Blyth & Co. Inc., of Seattle for a $350,000 revenue bond issue to help finance an expansion program.

● Anchorage Public Utilities of Anchorage, Alaska, has purchased from the General Electric Co. for $17,884 a 3,750-kva. transformer previously in service at nearby Sackett's Harbor.

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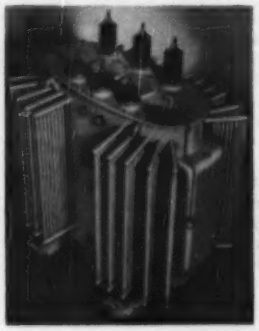

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COMPLAINT DISMISSED BY WASHINGTON BODY

Complaint of Eric and Grace Friedrich of Seattle against Puget Sound Power & Light Co. was dismissed by the Washington State Public Service Commission after the parties agreed to a compromise.

The Friedrichs installed electric heating in their home and connected onto Puget Power lines at a time when the company was refusing electrical heating contracts because of the power shortage. Because the heating overloaded the transformer serving that area, and larger transformers were unavailable at that time, the company disconnected the Friedrich home. The Friedrichs then filed suit for damages and to compel the company to restore service.

Under the compromise, the Friedrichs agreed to drop their suits provided the company supplied them with power. This the company was able to do, since application of the Friedrichs for power was made prior to a Public Service Commission order banning such contracts. The transformer capacity has been increased.

Puget Power Seeks Tax Recovery From PUDs

Puget Sound Power & Light Co. of Seattle, Wash., seeks recovery of more than $47,000 paid in taxes in 1949 in a suit filed in Mason County Superior Court at Shelton, against five PUDs.

The taxes concern property the company sold the PUDs of Lewis, Mason, Pacific, Grays Harbor and Cowlitz counties in 1948 and 1949. Sales occurred before the end of the tax-levying periods.

Largest amount, totaling $24,200, is sought from the Lewis County PUD. Amounts sought from other PUDs include Cowlitz, $13,728; Grays Harbor, $7,779; Mason, $1,455; and Pacific, $365.

Smith Troy, state attorney general, will represent the PUDs in the case.

● A SERIES of booklets designed to tell the story of utility safety work to mass audiences through the use of comic-book technique has been announced by Ebasco Services Inc. The artist and script writer on the original "Captain Marvel" series are doing the work on the new booklets, which are produced by Fawcett Publications Inc., 67 W. 44th St., New York. They are available at 3½c each up to 10,000; at lower cost in greater quantity. Space is provided on the last page for purchaser's imprint.

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NEWS ABOUT PEOPLE

● G. F. MAUGHMER, formerly manager of General Electric Co.'s apparatus department sales office at Los Angeles, has become manager of the company's new sales district with headquarters in St. Louis, Mo. Nine G-E apparatus sales offices are located in the area making up the new district. E. M. ELLIS succeeds Maughmer as Los Angeles manager of the company's apparatus department. Ellis has been manager of the department's industrial division in Los Angeles since 1926. This job has been taken over by R. E. JOHNSON.

● HAROLD J. NEWTON, at one time Western sales manager for National Electric Products Corp., has resigned as vice-president and general sales manager of the company. In 1931 he was made Western sales manager with headquarters in San Francisco. Newton was appointed sales manager of the corporation, returning to the Pittsburgh general offices in 1943, and elected vice-president and a director of the firm in 1948. His resignation brings to a close 38 years of continuous service for National Electric products. He plans to make a permanent home in California.

● DEAN FREDERIC E. TERMAN, head of Stanford University school of engineering, has been awarded the 1950 Medal of Honor of the Institute of Radio Engineers for his contributions to the radio and electronics industry as teacher, author, scientist and administrator. The presentation was made early in March in New York City as a feature of the IRE annual convention. This is the first time the award has been made to a Westerner.

● APPOINTMENT of CARL J. MORTON as resident field engineer in Alaska has been announced by Line Material Co. Morton was associated with Anchorage Municipal Utilities for two and one half years before joining Line Material Co. He will maintain offices in Anchorage. In addition a new warehouse, with stocks of L-M equipment, is being opened in Anchorage.

● HENRY B. TALIAFERRO is the newly appointed Sacramento regional power manager for the Bureau of Reclamation, filling a vacancy left when BEN W. CREIM was named administrator of the newly created interior department of the Southwestern Power Administration. Taliaferro has been Creim's assistant since the end of the war.

Walter J. Maytham, left, Westinghouse Pacific Coast district manager, received the Westinghouse Order of Merit in ceremonies at San Francisco March 9. Presentation was made by John K. Hodnette of Pittsburgh, vice-president, general manager of industrial products division for manufacturer

● JAMES A. BROWN, Pacific Coast service manager for Westinghouse Electric appliance division in San Francisco since 1944, has been transferred to New York and appointed general service manager for Westinghouse Electric Supply Co.

● EDWARD F. SIXTUS, vice-president in charge of sales of Pacific Electric Mfg. Corp. of San Francisco, announces the appointment of T. L. BISSELL, Charleston, S. C., as district sales representative for that area.

● WALTER A. TOLY, vice-president of Columbia Electric & Mfg. Co., Spokane, has been advanced to president of the company. Its former president, ERIC A. JOHNSTON has become chairman of the board.

Toly

● CENTRAL ARIZONA LIGHT & POWER Co. recently announced three promotions. With the transfer of EARL MAYER to northern Arizona as assistant to the general manager, BOB FIELD was named assistant to Lee Poe, central division manager. VESTON HARKREADER was appointed to head the Sunnyslope district as a replacement for RALPH O'BRIEN, who resigned to enter private business. SHELBY WEST moved to the Southside as Chandler district manager to fill a vacant position.

● E. H. "Dick" PEMBERTON has been named manager in charge of sales for Southern Colorado Power Co., Pueblo, Colo. He replaces GEORGE W. MILLIKEN, who retired after many years of service with the company.

● VERNE E. DODSON, former assistant to the Pacific District manager at San Francisco, has become district manager of engineering for General Electric's Northwestern district at Seattle. He headed the industrial section for the company's San Francisco engineering division until 1948, when he became assistant to the district manager. Dodson was awarded the company's highest honor, the Coffin Award, in 1942 for outstanding service in promoting electrical pumping equipment for agricultural purposes.

● CLARENCE F. "Sandy" PRATT, who fathered outdoor Christmas tree lighting campaigns throughout California for a number of years, died March 8, age 75. Originally in the sand and gravel business, he retired and for some years operated the California Refrigerator Co., distributor of refrigeration repair parts. He initiated the outdoor Christmas Tree Assn. in 1926 and carried it on as its leader until the war caused a cessation of outdoor lighting.

● FRANK S. JONES, 63, associate electrical engineer for Seattle City Light, died March 13 from injuries received in a traffic accident last fall. Employed by City Light for 43 years, he designed and built transformers used by the city from 1907 to 1925 and also designed the city's present relay system of street lighting.

● PETE DECKER, pioneer electrical contractor, proprietor of Decker Electrical Construction Co., San Francisco, died in San Francisco, March 6, 1950.

● KIMBALL VANCE, 47, owner-manager of Vance Electric Service Co., Salt Lake City, was killed when his automobile struck a truck on an icy road at Thistle, Utah, March 8.

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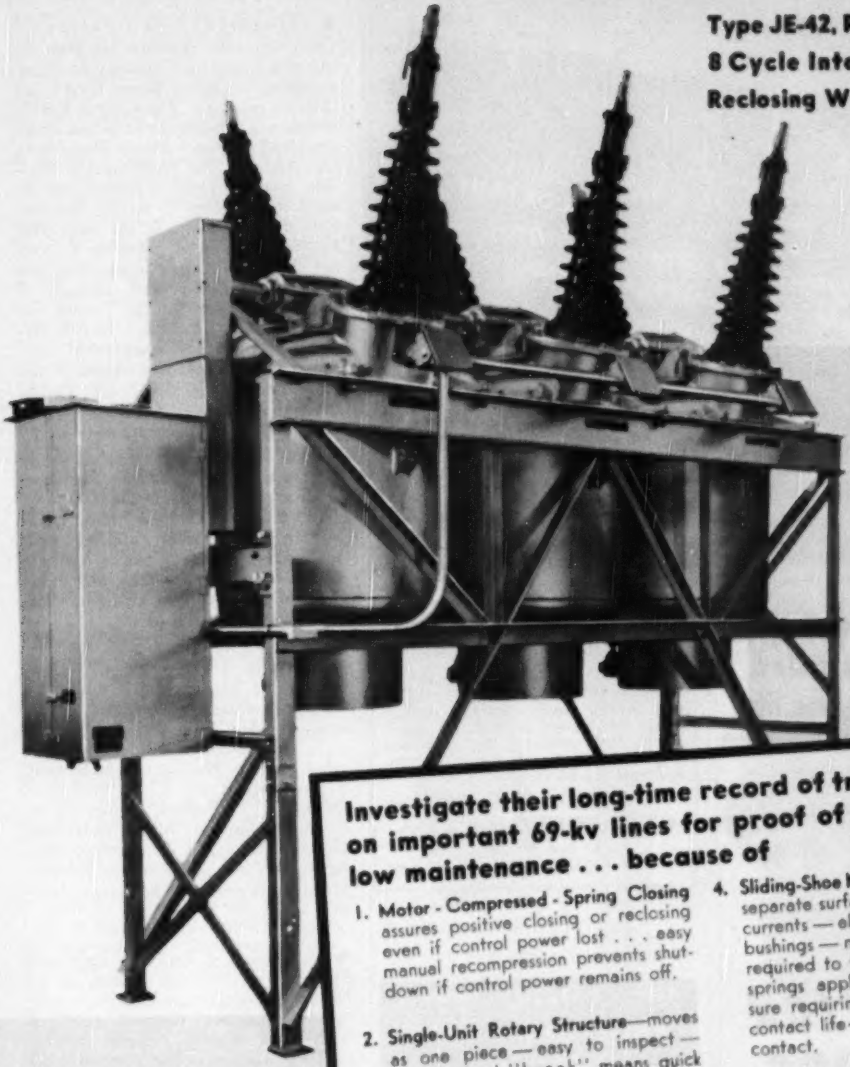

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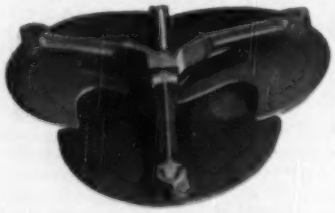

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NOTES ON THE TRADE

● Sylvania Electric Products' California sales division has been reorganized into two separate divisions, according to Garlan Morse, West Coast division manager. The Central Pacific Division will headquarter in San Francisco and the South Pacific Division in Los Angeles. The Northwestern Division, headquartered in Seattle, will remain in operation to service that section of the country. At the same time Robert C. Harper, formerly a member of the Los Angeles sales office, was appointed division sales manager of lighting products for the Central Pacific Division. Charles I. Brady, formerly supervisor of commercial engineering for lamps, was named to the same position in the South Pacific Division.

● Sylvania also announced it would open sales and distributing headquarters for northern California in Emeryville next May. The new building will initially provide sales offices and storage space for the company's northern California operations. The plant may later be used for light manufacturing, according to Garlan Morse.

● Pyramid Instrument Co., New York City, has appointed additional sales representatives for their products. Glidden Engineering & Equipment Co., Houston, will cover Texas, parts of New Mexico and Oklahoma. Representatives are J. M. Robertson, Dallas; J. T. Hodges, Tulsa; D. L. Glidden, Houston. Allied Industries, Los Angeles, will cover southern California, Arizona and southern Nevada. Elmer V. Aldridge is field representative.

● Tork Clock Co. has appointed Freeman C. Scharr, Seattle, as its Northwest sales representative, covering Washington, Oregon, northern Idaho and western Nevada. Service on Tork products in the Northwest will be available through the Abbott Electric Co., 1101 Eastlake Ave., Seattle.

● Western Insulated Wire Co., Los Angeles, has begun construction of a $500,000 factory for the manufacture of its neoprene jacketed electric cord.

● K. M. Ryals Co. has been formed by K. M. Ryals as a manufacturers' agency, specializing in utility lines. Office is at 474 Natoma St.

● CLINE-GRAY is a newly formed home appliance distributor with headquarters at 260 E. First South St. in Salt Lake City. The firm will distribute Presteline appliances in the Rocky Mountain region. W. G. Cline, partner, operates the W. G. Cline Co. in Denver. The other partner is James E. Gary, formerly factory representative of the Presteline firm in that area. John R. Woods, formerly manager of Glenn Earl Inc., Salt Lake distributor, has been named sales manager.

● KAISER STEEL Corp., Fontana, Calif., has appointed ERNEST F. DONATIC, former superintendent of electrical maintenance, to be division superintendent of plant service. GLENN THOMPSON, former assistant superintendent of electrical maintenance, will succeed Donatic as superintendent. BERNARD A. SHRIVE, former chief electrician, has become assistant superintendent of electrical maintenance.

● FLUORESCENT FIXTURES of CALIFORNIA, manufacturers of All-Brite fluorescent and slimline fixtures, recently held a house warming at its new San Francisco home office and plant at 3320 18th St. The production plant occupies 64,000 sq. ft. of space and is devoted exclusively to the manufacture of fluorescent and slimline luminaries. E. O. ANDERS is the founder and president.

● ELLIS PAINT Co., Butte, Mont., has been named distributor for Whirlpool home laundry equipment in the Butte area. The firm will handle the entire Whirlpool line of washers, ironers and the recently introduced clothes dryers.

● DAN H. RADKE Co. announces that a complete stock of Marco recessed lighting fixtures and the new Marco Filter Fan will be carried in his San Francisco warehouse, 754 Natoma St.

● PHELPS DODGE COPPER PRODUCTS Corp. has moved its Seattle offices to 505 Skinner Bldg. They were formerly located at 1921 Smith Tower.

● RADIO SUPPLY Co., Salt Lake City, recently moved from 45 E. Fourth South to 157 E. Motor Ave.

REPRESENTATIVES WANTED

If interested please write Electrical West, 68 Post St., San Francisco 4, Calif.

Eastern manufacturer of test clips, grounding clamps, insulator supports, etc., is seeking a representative in the Northwest territory.

An Eastern manufacturer of lineman tool belts, pole straps, climber straps and tool pouches is interested in securing Western representation.

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When you're selecting automatic time switches for indoor and outdoor uses, remember the name "Tork" for all these advantages.
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These Sherman Splicing Sleeves give your workmen the finest of material with which to make strong, permanent, corrosion-free joints of highest conductivity. A highly dependable line of sleeves, widely used throughout the electric utility trade. Each sleeve stamped for easy identification. Low in price. Write for Bulletin No. 20.

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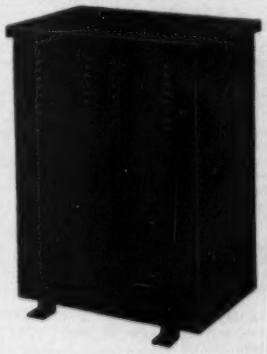

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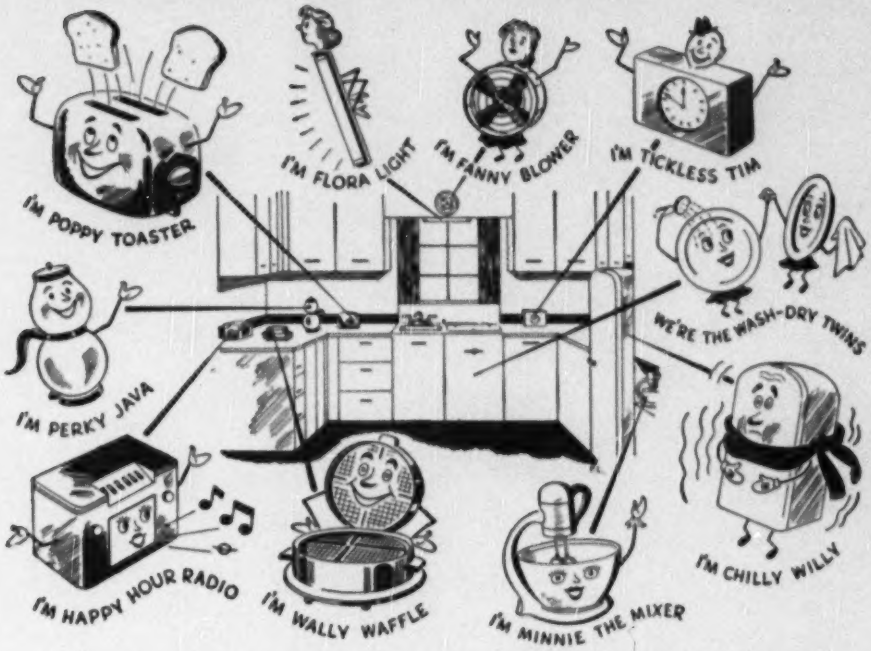
PROFILES

"Dr. Einstein" (Bill Cyr) was called upon to solve by mathematics the problem of a new president for San Francisco Electric Club. After ingenious computations Ray Turnbull was found to be the answer and was inaugurated president

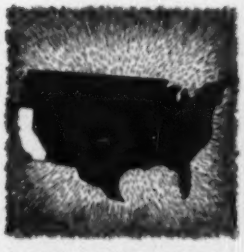
Taken at the sixth annual wiring conference in St. Louis: Homer Bender, Washington Water Power Co.; Ralph Hubbard, Rocky Mountain Electrical League manager, Denver, and Charles W. Coleman of the Utah Power & Light Co.

Studying quarter century report of the Washington Farm Electrification committee at 25th anniversary celebration in Walla Walla: Karl Dimmitt, Puget Sound Power & Light; D. B. Leonard, Pacific Power & Light; Harry Garver, Department of Agriculture, the committee's original investigator; Roy H. Skill, PP&L; L. J. Thrailkill, Washington Water Power. Pacific Power & Light was host

"We work for pennies a day!"



Young homemakers of today can get a complete dinner on the table, from salad to dessert, in about half the time it took Mother twenty years ago. Of course, Mother did her work by hand, while Daughter has a staff of electric servants helping her. Low cost electricity, for example, runs a mixer for three hours for less than a penny. And the electric dishwasher washes and dries a daily quota of dishes for just a fraction more. Do you work in a brightly lighted kitchen, with the air swept clean of cooking fumes and completely staffed with wired help? Thousands of happy housewives save time and energy in an electric kitchen. Why not you?



One of the bright spots for electric appliance sales in the Nation is your part of California, where practically all of the homes and farms are wired for electricity. And serving you here are nearly 2,300 friendly and helpful electric appliance dealers.

Low electric rates mean good business for the electric dealers in your community. Last year, retail dealers sold 93,000 refrigerators, 73,000 washers, 30,000 vacuum cleaners, 11,000 home freezers, and 10,000 ironers in Northern and Central California.

For the record

LIVING COSTS UP

It takes many more dollars to buy what your family needs today. Living costs in San Francisco, for example, are now more than 51% higher than in 1923 and 87% higher than in 1933.

ELECTRIC COSTS DOWN

Despite the rising cost of living, the price of electricity has gone down and down. NINE major rate reductions made by this company since 1923—the latest in 1946—have cut the cost of household electricity more than 50%.

P·G·and E· PACIFIC GAS AND ELECTRIC COMPANY

EW-6X-450

today, **profits** *tomorrow, next year*

Of course you could use a crystal ball, but better signs forecasting the future of electrical appliance selling are "Adequate Wiring" signs. They mean comfort and convenience for homes — and *sales* for appliance dealers! It's a simple formula: *The more signs, the more sales.*

Adequate Wiring means circuits, outlets and switches to keep today's appliances operating efficiently — and facilities for future installations, too. It eliminates the problem of trying to sell tomorrow's appliances to yesterday's homes.

So for your customers' sake and your own, promote Adequate Wiring. You'll profit from it today — and next week and next month and next year!

PACIFIC COAST ELECTRICAL ASSOCIATION

601 West Fifth Street, Los Angeles 13, Calif.

447 Sutter Street, San Francisco 8, Calif.